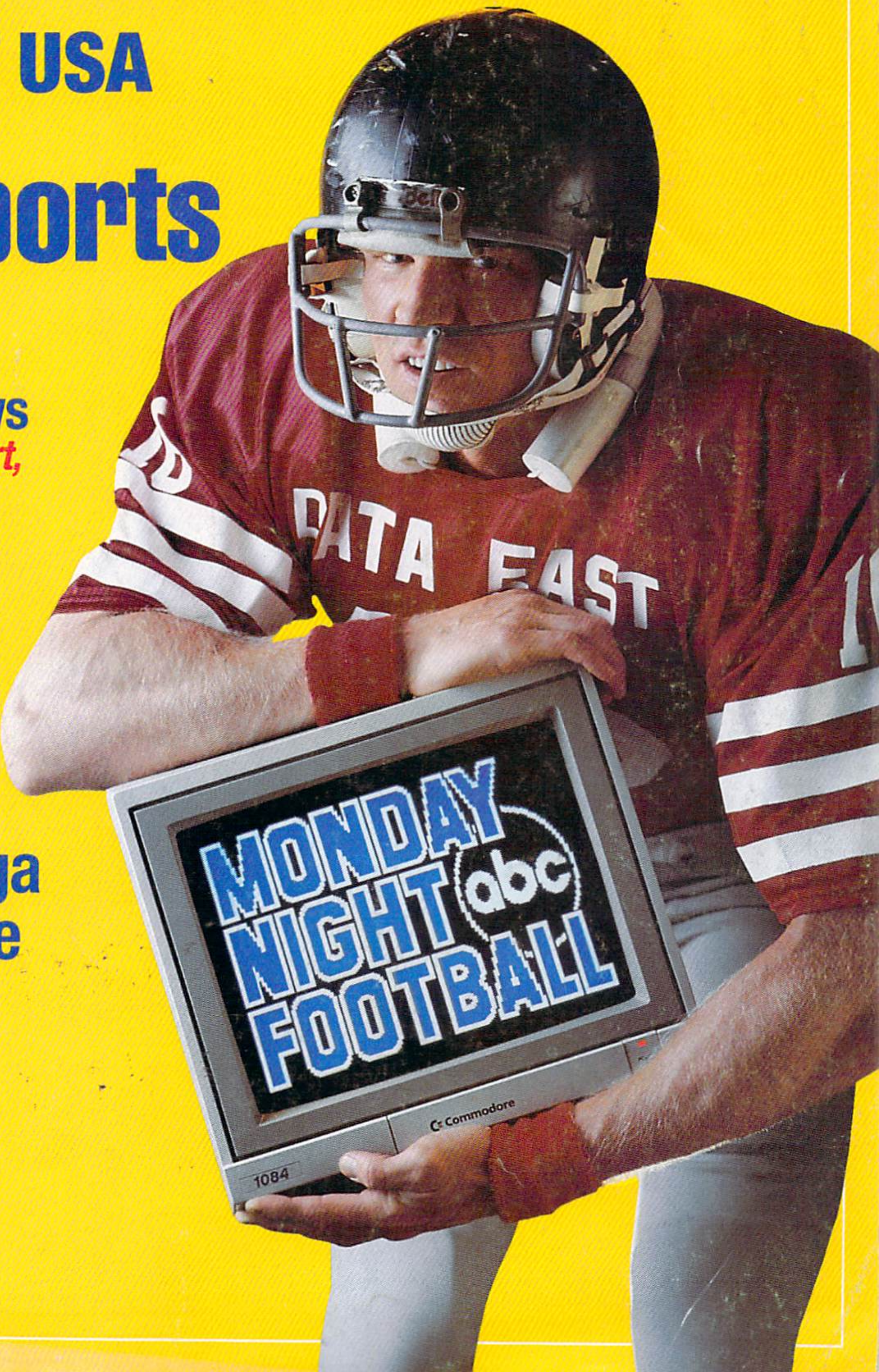
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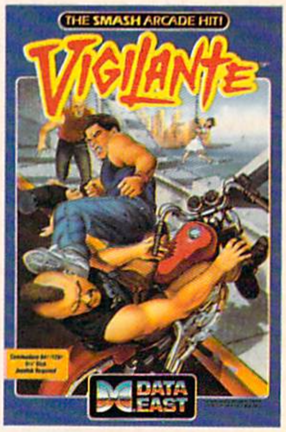
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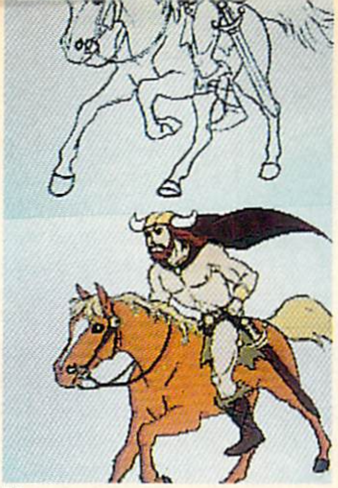


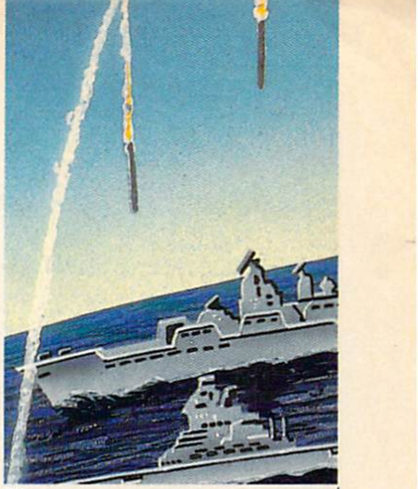
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Commodore
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SEPTEMBER 1989, *Volume 10, Number 9*


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FEATURES

REVIEWS

COVER STORY

COVER PHOTO: *Dennis Degnan*
Software: *ABC Monday Night Football* by Data East USA

DEPARTMENTS

WordPerfect Decision Reversed

Several months ago, WordPerfect Corporation announced that they would not be developing any future Amiga releases. Amiga users were quick to protest the decision—their response was instrumental in getting the company to rethink their earlier announcement and recommit themselves to Amiga development.

Here are letters from two concerned readers, along with WPCorp's response:

An Open Letter to Amiga Users:

I have been an Amiga owner now for the last year and a half. After purchasing the Amiga, I was thrilled to hear that WordPerfect gave support to the Amiga with not *one* program but *two (WordPerfect 4.1* and *Library)*. My heart leaped that WPCorp decided to support the Amiga, it gave me a sense of security knowing that an IBM giant would support the Amiga.

With the continued sales of *WordPerfect* and *Library,* a customer representative from WordPerfect told me, *PlanPerfect* and *WordPerfect 6.0* would be released on the Amiga platform! That is not a misprint, six point oh, on the Amiga! Again my heart leaped for joy, Amiga would be even further recognized as a more "serious" computer with the coming of *WordPerfect 6.0*.

This sadly, is no longer the case. According to a representative I spoke with today, WPCorp has decided to "temporarily" halt research and development of *PlanPerfect* and *WordPerfect 6.0*. According to him this is due to the slow down in sales of the previous products.

Amiga Users, my point is not to tell you to immediately go out and buy *WordPerfect*, rather we should rally together and send in letters to WPCorp. It doesn't have to be anything elaborate—just a simple note stating that you are an Amiga user and would be interested in purchasing *WordPerfect 6.0* when it becomes available. We are now one million strong and with one million letters being sent to WordPerfect's mail box, support will resume!

Sincerely,
Alex Yang
Whitestone, NY

To the Editor:

WordPerfect Corp. announced recently that they are completely ceasing development of all new Amiga products. There will be no new products released for the Amiga, and currently existing products will be supported only by bug fixes.

I don't know about you, but this alarms me. It alarms me because the availability of *WordPerfect* for the Amiga is an important part of the Amiga's relative success recently. Perhaps people do not fully realize just how much *WordPerfect* is responsible for the success of the Amiga recently: without the support of WPCorp the Amiga will decline. I know a *lot* of people who have been looking forward to *WordPerfect 5.0* being released for the Amiga, and they will probably decide to purchase either Macintosh or IBM computers when they hear that 5.0 will never be available for the Amiga.

This also angers me, because WPCorp has been saying for some time that they are working on a version of *WordPerfect 5.0* for the Amiga. By totally ceasing development of all future products for the Amiga, they are breaking a promise they had made to the Amiga community to continue to develop Amiga versions of all their products.

I urge all Amiga users to write and/or call WPCorp and tell them that you would like to continue to see new products for the Amiga. The toll-free number for the WordPerfect Amiga Products office is (800) 321-3204. When you call this number, tell the customer support representative that you would like to continue to see new products developed for the Amiga—including *WordPerfect 5.0, PlanPerfect* and *DataPerfect*. (This number is also open to people who wish to receive information about WordPerfect products for the Amiga.) Or you can write to: WordPerfect Corporation, 1555 N. Technology Way, Orem, UT 84057.

If a lot of people call and write about this, they will probably reconsider their decision to cease development of Amiga products, and the future of the Amiga will be greatly enhanced.

Sincerely,
Marc Barrett
Council Bluffs, IA

WordPerfect's Response

As you are aware, WordPerfect Corporation's commitment to developing for the Amiga has been the subject of much discussion. At one point, WPCorp officials had announced that they planned to pull back on all future product development for the Amiga. Reaction from a large

Continued on page 5

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Continued from page 4

WPCorp officials that our position regarding product development for the Amiga should be reconsidered.

As a result, WPCorp will continue development of *WordPerfect* for the Amiga. *WordPerfect 4.1* is the most current version. We are currently working on an interim release of the product that will include minor enhancements and fixes problems with the software. As soon as that is released, we will begin working on a new version of *WordPerfect.* We will also continue to maintain and provide interim releases of *WordPerfect Library* for the Amiga.

It is true that WPCorp has scaled back its development staff for the Amiga. The primary reason for the cutback is the fact that sales of *WordPerfect* for the Amiga have been low. Sales were good when the products were initially released, but they declined significantly soon afterwards. Profits from WPCorp's Amiga products were not high enough to cover the costs of the Amiga development staff. So in order to make the Amiga division profitable, WPCorp executives decided to scale back the division.

Currently there are three full-time Amiga programmers and two full-time testers working on WPCorp products. We also have a marketing manager in addition to our regular Amiga customer support staff. We definitely plan to continue supporting *WordPerfect* and *WordPerfect Library* for the Amiga. We had begun development of *PlanPerfect*, WPCorp's spreadsheet, for the Amiga, but we chose not to pursue this so that we may concentrate our limited resources primarily

As a result of customer requests, WPCorp began preliminary development of a 6.0 version of *WordPerfect* that includes support for graphics. The current code in *WordPerfect 4.1* will not allow the addition of a graphics capability. To develop a 6.0 version of *WordPerfect* would require that we completely rewrite the program from scratch, or that we wait until a 6.0 equivalent is available on another machine so that it could be ported over to the Amiga. Using either of these two methods is a very costly and time-consuming process, and it would take one to two years and maybe more to develop a 6.0 version of *WordPerfect.* Given the timing and resources available, it is difficult to commit to a 6.0 upgrade at this time. However, development will move incrementally towards that goal.

Once again, WordPerfect Corporation is committed to supporting the Amiga market. This commitment is evidenced by the fact that WPCorp is one of the few companies that offers toll-free support for its Amiga products. We regard the Amiga computer and its users very highly and we're proud of our products for the Amiga.

Sincerely,
Rebecca Mortensen
Amiga Products Publicist
WordPerfect Corporation

Information, Please . . .

To the Editor:

I own a Commodore 128 computer and would like to upgrade the Video Display Controller and RAM to 64K.

Relative to this I read Mark Jordan's article in the June issue of *Commodore Magazine* and wrote to Combo Ltd. as you suggested to obtain information about "The Graphic Booster 128" Kit. My letter was returned since the box at the post office had been closed.

I would appreciate receiving information about how to obtain a kit to update the 128 to 64K RAM for the VDC.

Sincerely,
F. DeSantis
Quincy, MA

Editor's Response:

You can obtain the kit from Briwall, P.O. Box 129, 58 Noble St., Kutztown, PA 19530; (215) 683-5433 or from Software Support International, 2700 N.E. Anderson Rd., #A1, Vancouver, WA 98661; (206) 695-9648.

Dear Editor:

Recently I read Jeff Spira's column entitled "Core Wars" and was very interested in this type of gaming. I have never heard of anything like this before and would like to know more about how to get involved. Please send me the mailing address for the International Core Wars Society.

Congratulations on a great column. I enjoyed it very much and am looking forward to reading your column in the future.

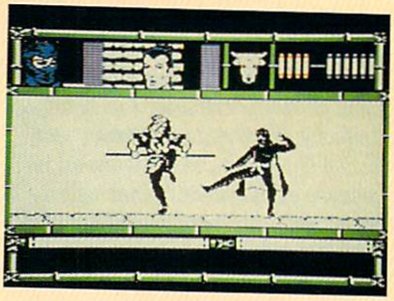
Yours truly,
Ken Town
Parkhill, Ontario
Canada

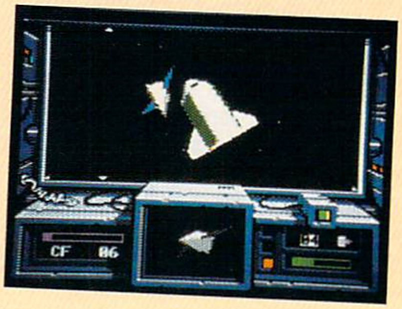
Editor's Response:

You can contact William Buckley at the International Core Wars Society, 5712 Kern Drive, Huntington Beach, CA 92649-4535.

A Quartet from Origin Systems







Origin Systems has announced a September release for four new Commodore 64 games. **Space Rogue** immerses the player in a world of sophisticated 3-D space flight simulation and multi-media sensation. **Knights of Legend** takes the player on a journey through a medieval fantasy world that includes a very comprehensive combat system. **Windwalker** advances animated martial arts into an Oriental tapestry of people, places and events. **Omega** allows players to build and program custom military vehicles called cvbertanks. The cvbertanks can then battle other cybertanks included with the game, or from other **Omega** owners. Origin is hoping to keep the cybertank code compatible across all machine formats so that cybertank competitions could be arranged at national levels. The suggested retail price of **Space Rogue, Knights of Legend** and **Omega** is $49.95. **Windwalker** has suggested retail price of $39.95. For more information contact: Origin Systems, 136 Harvey Road, Building B, Londonberry, NH 03053. Phone: (603) 644-3360.

New Infocom Adventure

Infocom has released **Arthur: The Quest for Excalibur** for the Amiga. Players assume the role of a young Arthur on a quest for Excalibur, the legendary sword that will make him King of England. Players have three days to develop the kingly qualities of wisdom, chivalry and experience necessary to win the sword in the stone back from the evil King Lot. Game play is enhanced with more than 100 graphic images of medieval England, and the ability to change form with help from the magician Merlin. Merlin's crystal ball for on-screen hints, an undo command to reverse foolish decisions and on-screen mapping are a few of the special features of the game. The suggested retail price of **Arthur: The Quest for Excalibur** is $49.95. For more information contact: Infocom, Inc. 125 Cambridge Park Drive, Cambridge, MA 02140. Phone: (617) 492-6000.

New titles from Mindscape

Mindscape has announced three new games covering a wide spectrum of game-play. **Gauntlet II** provides more than 100 new mazes along with animation and fast-paced action in this arcade hit adaptation. Digitized sound on the Amiga replicates the arcade's sound effects, speech and music. **Gauntlet II** is available now for the Amiga ($49.95) and Commodore 64 ($29.95). Players can test their daredevil skills on the trapeze, the high-wire and four other cartoon-style circus events in **Fiendish Freddy's Big Top O'Fun. Fiendish Freddy** offers a satiric, twisted look at six circus events, rendered in slapstick style and will be available for the Amiga in August. The suggested list price will be $49.95. **Star Trek V: The Final Frontier** allows you to take the role of Captain James T. Kirk in charge of the starship Enterprise. Based on the movie of the same name, this fully animated story includes digitized images and sound, Klingons and the entire crew of the Enterprise. Your mission is to cruise to the center of the galaxy and deliver three intergalactic ambassadors to a safe haven. **Star Trek V** is planned for the Amiga in January of 1990. The suggested list price will be $54.95. For more information contact: Mindscape Inc., 3444 Dundee Road, Northbrook, IL 60062. Phone: (312) 480-7667.

New SportTime Label



SportTime Computer Software, developers of award winning computer games such as **Indoor Sports** and **Superstar Ice Hockey** has announced that SportTime products will now be published under its own label. The first Amiga title to be released under this new label will be **Omni-Play Basketball.** The Omni-Play system allows the player to expand the software through the purchase of additional modules. Omni-Play modules for Basketball will include End-View and Side-Court perspectives of both professional and college

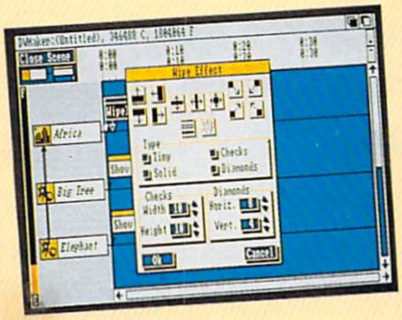
basketball team data disks. **Omni-Play Basketball** has a suggested list price of $34.95. For more information contact: SportTime, 3187-G Airway Ave., Costa Mesa, CA 92626. Phone: (714) 966-1311.

Bullfrog Presents Populous



Electronic Arts announces its 30th Amiga product and the first developed by its European division. The game, developed by the European artist group Bullfrog is called **Populous. Populous** is an original game concept which pits two gods, one good and one evil, against each other. The player assumes the position of god and tries to claim and populate new lands, attract new followers and wipe out the opponents population. The game features 3-D maps and animation and can be played against the computer, an opponent or via modem. Players begin the game by leveling land on which their followers can settle. As a deity, players can use the forces of nature against enemies, creating swamps and causing floods, earthquakes and volcanoes. For more information contact: Electronic Arts, 1820 Gateway Drive, San Mateo, CA 94404. Phone: (415) 555-7171.

Amiga Desktop Video



Electronic Arts will introduce **DeluxeVideo III,** a professional desktop video Amiga package, in September, **DeluxeVideo III** provides complete control over the Amiga's graphics, animations and sounds with a visually oriented interface and the integration of sound effects, music and MIDI. Videos created by **DeluxeVideo III** can be recorded on videotape or played back through the Amiga. **DeluxeVideo III** supports all amiga resolution modes, super bitmaps, high speed animation, MIDI output and IFF standard sound and music files. All Anims and AnimBrushes created with **DeluxePaint III** can be incorporated into videos, and combined with other pictures, sound effects and music. **DeluxeVideo III** has a suggested list price of $149.95. For more information contact: Electronic Arts, 1820 Gateway Drive, San Mateo, CA 94404. Phone: (415) 555-7171.



Titan Wins CES Award

Titan, the fast-paced strategy puzzle game from Titus Software won a 1989 Innovations Award from the CES in Chicago (June 1989). **Titan** features an over-scan, eight direction scrolling screen with multiple levels of increasing difficulty. The suggested list price is $44.95 for the Amiga version and $39.95 for the Commodore 64 version. For more information contact: Titus Software, 20432 Corisco St., Chatsworth, CA 91311. Phone: (818) 709-3692.

Microfiche Filer Plus Wins CES Award

Microfiche Filer Plus, an Amiga microfiche-style database published by Software Visions won a CES Innovations 89 Award in the Business Software category. "We're quite proud that **Microfiche Filer Plus** has received this award," stated Gary Samad, president of Software Visions. "It's great to see the rest of the computing world recognizing an Amiga product as among the best in a market dominated by Macintosh and PC software." For more information about **Microfiche Filer Plus** contact: Software Visions, Inc., P.O. Box 3319, Framingham, MA 01701. Phone: (508) 875-1238.

New Gaming Aids from CES

by Russ Ceccola

The Consumer Electronics Show is a source of new software and hardware for all computer users. While many interesting items debut at the show, these two items seemed especially interesting — and useful as well.

First off is the Strike Force Navigator — a helpful aid to simulation game players from a new company set up to market and sell the aid, Advantage Ace. Ed Moran, president of Advantage Ace, developed the Strike Force Navigator in response to complaints from players of

simulation games. They complained about missing a target by a few degrees or crashing a vehicle because of a heading that was off by a few degrees.

What Moran developed is so simple that I'm surprised someone else didn't think up the idea a long time ago. Moran is just as surprised. The Strike Force Navigator is nothing more than a circular piece of clear plastic with a handle. The important thing is what's on that piece of plastic — a 360-degree navigation compass.

You can use the compass in those critical times when you need exact measurements. By placing the Strike Force Navigator against the computer monitor on top of whatever radar or on-screen map you might be looking at, you can read off the heading that you need from the compass. The smallest division on the compass is five degrees, but that should be enough accuracy for the most demanding game. The handle has a 30-degree bend for easy maneuvering and the price is pretty low — only $8.95. All you die-hard simulation gamers should go out and get one of these things immediately — they really help your game!

The other new product I wanted to discuss is the Wico Ergostick. Up until the time I took home my Ergostick from the Consumer Electronics Show, I swore by my Epyx 500XJ joysticks. Even now, I use them for most joystick work. But the Wico Ergostick is designed for maximum comfort — simple ergonomics. When do I really need a comfortable joystick? When I'm playing for long periods of time, of course. That's when I call in my Ergostick.

The Ergostick is very durable and made of a soft, pliable plastic that fits into your hand comfortably. The switches on the inside of the stick are very responsive — more so than the 500XJ. Wico has been designing arcade joysticks for years and thay are the stick of choice in the arcade industry. Now the home game players can experience the arcade joystick in the comfort of their own homes. Shaped just like the 500XJ, Wico took the design further by adding the pliable plastic and more-responsive switches. Because of my knowledge of arcade games, I know that all switches will wear out eventually. That's the only drawback of both designs. By the time that happens, however, I'll be ready to buy a new stick anyway. In any case, Wico's Ergostick lives up to all that they promise and should be your first choice when looking for a new joystick.

The World of Commodore

Attention Commodore enthusiasts in the mid-atlantic states! The next World of Commodore is coming to the Valley Forge Convention Center in King of Prussia, PA. Show dates are September 22-24, 1989. For ticket information contact The Hunter Group at (416) 595-5906.

Companies Announcing New Releases at CES

Accolade, Inc.
550 S. Winchester Blvd.
Suite 200
San Jose, CA 95128
(408) 985-1700

Activision
distributed by Mediagenic

Britannica Software
345 Fourth Street
San Francisco, CA 94107
(415) 546-1866

Broderbund Software
17 Paul Drive
San Rafael, CA 94903
(415) 492-3200

Data East USA
1850 Little Orchard Drive
San Jose, CA 95125
(408) 286-7080

Electronic Arts
1820 Gateway Drive
San Mateo, CA 94404
(415) 571-7171

Epyx, Inc.
600 Galveston Drive
Redwood City, CA 94063
(415) 366-0606

Infocom
distributed by Mediagenic

Mediagenic
3885 Bohannon Drive
Menlo Park, CA 94025
(415) 329-0500

Mindscape, Inc.
3444 Dundee Road
Northbrook, IL 60062
(312) 480-7667

Origin
136 Harvey Road, Bldg. B
Londonderry, NH 03053
(603) 644-3360

Sega
distributed by Mindscape

SportTime Computer Software
3187-G Airway Avenue
Costa Mesa, CA 92626
(714) 966-1311

Taito Software, Inc.
267 W. Esplanade
Suite 206
N. Vancouver, B.C.
Canada V7M 1A5
(604) 984-3344

Software Announced at CES

(***bold** denotes new release*)

Publisher	Title	Retail Price/Availability 64	Amiga	PC
Accolade	*Fast Break*	$29.95/Avail	**$44.95/Avail**	$39.95/Avail
Activision	*Ghostbusters II*	**34.95/1989**	**39.95/1989**	**49.95/Oct**
	Die Hard			**49.95/1989**
	Tongue of the Fatman			**49.95/Sept**
	MechWarrior			**49.95/Fall**
Britannica	*Archipelagos*		**39.95/Summer**	**39.95/Summer**
	Eye of Horus	**39.95/Fall**	**39.95/Fall**	**39.95/Fall**
Broderbund	*The Family Software Library*	**69.95/Avail**		
	Licence to Kill	**29.95/Avail**	**34.95/Avail**	**34.95/Avail**
Data East	*ABC Monday Night Football*	**TBA/TBA**		**TBA/FALL**
	Batman	24.95/Avail	**44.95/Avail**	
	Robocop	34.95/Avail	**44.95/Avail**	**39.95/Avail**
	Vigilante	**24.95/Avail**	**44.95/Avail**	**29.95/Avail**
	Super Hang On	**29.95/Avail**	**44.95/Avail**	**29.95/Avail**
	Heavy Barrel	**29.95/Avail**		**39.95/Avail**
	Bad Dudes		**44.95/Avail**	39.95/Avail
Electronic Arts	*DeluxeVideo III*		**149.95/Sept**	
	Populous		**44.95/July**	
	Powerdrome		**39.95 Aug**	
	Swords of Twilight		**49.95/Sept**	
Epyx	*Snow Strike*	**34.95/Fall**		**44.95/Fall**
	Ishido		**49.95/Winter**	**39.95/Winter**
	California Games II			**49.95/Winter**
	Purple Saturn Day	**39.95/Fall**	**39.95/Fall**	**39.95/Fall**
	Revenge of Defender	**34.95/Fall**	**39.95/Fall**	**34.95/Fall**
	Flyton 500			**49.95/Winter**
Infocom	*Arthur: The Quest for Excalibur*		**49.95/Avail**	**39.95/Avail**
Mindscape	*Star Trek V: The Final Frontier*		**54.95/Jan '90**	**54.95/Sept**
	Gauntlet II	**29.95/Avail**	**49.95/Avail**	**39.95/Avail**
	Fiendish Freddy's Big Top O' Fun		**49.95 Aug**	**44.95 Aug**
	The Colony		**49.95/Fall**	**49.95/Avail**
	Hostage	**29.95/Avail**	44.95/Avail	39.95/Avail
	Deja Vu II: Lost in Las Vegas		49.95/Avail	49.95/Aug
	Harley Davidson®: The Road to Sturgis		**49.95 Jan '90**	**49.95/Sept**
Origin	*Space Rogue*	**49.95/Sept**		**49.95/Sept**
	Knights of Legend	**49.95/Oct**		**49.95/Oct**
	Windwalker	**39.95/Sept**		**39.95/Sept**
	Omega	**49.95/Sept**		**49.95/Sept**
Sega	*After Burner*	**34.95/July**	**49.95/Sept**	**39.95/Aug**
	Shinobi	**34.95/July**	**49.95/Sept**	**39.95/Sept**
	Thunder Blade	34.95/Avail	49.95/Avail	**39.95/Sept**
	Action Fighter	24.95/Avail	39.95/Avail	**29.95/July**
SportTime	*Omni-Play Horse Racing*			**49.95/Avail**
	Omni-Play Basketball	**34.95/Avail**	**49.95/Avail**	**49.95/Avail**
Taito	*Rambo III*	**29.95/Avail**	**34.95/Avail**	**TBA/TBA**
	Arkanoid II—The Revenge of Doh	**29.95/Avail**		**34.95/Avail**
	Sky Shark	**29.95/Avail**	**34.95/Avail**	**34.95/Avail**

Compiled by Louis F. Sander

Lou Sander's Tips & Tricks

Here are some more of the best entries in our "useful program" contest. Over 200 programs were submitted, and the final judging is still going on, in spite of our desire to have it finished by now. Basically, the contest's ground rules were that the program had to do something useful and had to take up three or fewer blocks on the disk. As you can see from the gems below, the definition of "useful" covers many areas of human activity.

When you type these programs in, you might notice that some of them take up more than three blocks on the disk. That's due to polishing done in the editorial department, rather than failure to abide by the rules.

As always, I hope you enjoy the efforts of your fellow readers. Send your own best efforts to:

Louis F. Sander
P.O. Box 101011
Pittsburgh, PA 15237

I read every submission, but I give preference to those that are printed or typed on a single, double-spaced sheet of paper. If your tip includes a program, you'll improve its chances by sending a disk as well as a printout.

Successful contributors get to see their name and work in print, plus a check for $10–$50.

Touch Type: If you don't have access to a commercial typing tutor program, you'd do well to try Touch Type. For the price of the few minutes it takes to type in the listing, this program provides a powerful learning tool with features that rival many commercial programs.

The key to touch typing is forcing your fingers to find the keys without looking at the keyboard. Touch Type accomplishes this by providing an on-screen keyboard to help you find your way.

When run, Touch Type gives you a line of eight characters, including a space, that you must duplicate. Audible and visible feedback tells you if you've hit the proper key. When you've finished those eight characters, press RETURN for another random set.

The program's real power is that it lets you proceed at your own pace through various levels. Level 1, for instance, covers only the home keys for the left hand. Level 2 adds the home keys for the right hand, while Level 3 adds the G and the H. At Level 9, you are using the entire set of alpha keys.

Notice that the sample keyboard highlights the keys in use at each level. Use the F1 key to change levels.

Bob Snader
Baltimore, MD

```
100 PRINT"[CLEAR,RVS,SPACE9]
    TOUCH TYPE - BOB SNADER[SPACE8]"
    :POKE 53281,0
110 INPUT"[DOWN] LEVEL (1-9)";L
120 PRINT"[DOWN] <F1> TO CHANGE LEVEL"
130 FOR N=1 TO 9:READ A$(N):READ L(N)
    :READ M(N):NEXT:S=54296:B$=""
140 FOR T=1 TO L:B$=B$+A$(T):NEXT
150 POKE 214,9:PRINT
160 PRINT TAB(10)"Q[SHFT M]W[SHFT M]E
    [SHFT M]R T[SHFT M]Y U[SHFT M]I
    [SHFT M]O[SHFT M]P"
170 PRINT TAB(11)"A[SHFT M]S[SHFT M]D
    [SHFT M]F G[SHFT M]H J[SHFT M]K
    [SHFT M]L[SHFT M]:"
180 PRINT TAB(12)"Z[SHFT M]X[SHFT M]C
    [SHFT M]V B[SHFT M]N M[SHFT M],
    [SHFT M].[SHFT M]/"
190 FOR N=1 TO L:FOR T=0 TO M(N)STEP 2
    :POKE 55706+T+L(N),1:NEXT:NEXT
200 GOTO 320
210 POKE 214,15:PRINT:POKE 211,16
220 FOR T=1 TO 8:R=INT(RND(0)*(LEN(B$)
    )+1):C$=C$+MID$(B$,R,1):NEXT
230 R=INT(RND(0)*3)+3:D$=LEFT$(C$,
    R)+" "+RIGHT$(C$,(8-R))+CHR$(13)
    :PRINT D$
240 POKE 214,16:PRINT:POKE 211,16
250 FOR T=1 TO 10
260 GET E$:IF E$<>""THEN 260
270 GET E$:IF E$=""THEN 270
280 IF E$="[F1]"THEN RESTORE:GOTO 100
290 IF E$=MID$(D$,T,1)THEN POKE S,15
    :POKE S,0:PRINT E$;:GOTO 310
300 FOR B=0 TO 10:POKE S,5:POKE S,0
    :NEXT:GOTO 260
310 C$="":NEXT
320 FOR C=1720 TO 1728:POKE C,100:NEXT
    :GOTO 210
330 DATA"ASDF",41,6,"JKL
    :",53,6,"GH",49,2,"QWER",,6,
    "UIOP",12,6,"TY",8,2,"ZXCV"
340 DATA 82,6,"BNM",90,4,",./",96,4
```

64 Right Typer: This simple alternative to an expensive word processor runs only on the 64. It lets you type one line at a time, which you can edit by using the cursor and DELETE keys.

When finished with a line, press RETURN and it will be printed on your printer.

The following keys are used to access these special features:

CTRL 9 RVS On
CTRL 0 RVS Off
F1 Lowercase/Uppercase Mode
F3 Uppercase/Graphics Mode
F5 Form Feed
F7 Quit

The program will not let you type more than one line at a time. When you reach the end of the second screen line (the end of the 78-column printed line), it waits for a RETURN or a DELETE. If you'd like it to automatically print the line when you reach that point, change line 110 to:

110 IF L>78 THEN 180

Garrett D. Wilson
Chelsea, OK

```
10 REM 64 RIGHT TYPER - GARRET D.
   WILSON
20 D$="[HOME,DOWN23]":P$="........."
   :GOTO 40
30 PRINT"[HOME,RVS]";P$;"1";P$;"2";P$;
   "3";P$;"4";P$;"0";P$;"0";P$;"0";P$;
   "0[RVOFF]";:RETURN
40 OPEN 4,4,7:POKE 650,128
   :PRINT CHR$(8);CHR$(14),"[CLEAR]"
50 POKE 204,1:W$="":L=0
   :PRINT D$;"[DOWN2]";:GOSUB 30
   :PRINT D$;
60 POKE 204,0:GET K$:IF K$="" THEN 60
70 C=ASC(K$):IF C=13 THEN 180
80 IF C=20 AND L<>0 THEN GOSUB 190
   :L=L-1:GOTO 170
90 IF C=18 OR C=146 THEN W$=W$+CHR$(C)
   :GOTO 170
100 IF C=136 THEN CLOSE 4:POKE 204,1
    :PRINT CHR$(9);CHR$(142);"[CLEAR]"
    :POKE 650,0:END
110 IF L>78 THEN 60
120 IF (C>31 AND C<128) OR (C>159 AND
    C<256) THEN W$=W$+CHR$(C):L=L+1
    :GOTO 170
130 IF C=133 THEN CLOSE 4:OPEN 4,4,7
    :PRINT CHR$(14);:GOTO 60
140 IF C=134 THEN CLOSE 4:OPEN 4,4,0
    :PRINT CHR$(142);:GOTO 60
150 IF C=135 THEN PRINT#4,CHR$(12)
    :GOTO 60
160 GOTO 60
170 PRINT CHR$(C);:GOTO 60
180 PRINT#4,W$:GOTO 50
190 D=ASC(RIGHT$(W$,1))
    :W$=LEFT$(W$,LEN(W$)-1)
    :IF D=18 OR D=146 THEN 190
200 RETURN
```

Loan Calculator: This program answers the two most common questions asked when borrowing money: "What will my payments be?" and "How much can I borrow for a given monthly payment?"

Just run it and answer the questions. Do not use dollar signs or commas in the amounts for the Loan or Monthly Payment, and do not include the percent sign in the Interest Rate. For interest rates, the program assumes monthly compounding.

Mark Adducchio
Dayton, OH

```
100 PRINT"[CLEAR,RVS,SPACE4]
    LOAN CALCULATOR - MARK ADDUCCHIO
    [SPACE4]"
110 PRINT"[DOWN]DO YOU WANT TO KNOW
    (P)AYMENT SIZE"
120 INPUT"OR (L)OAN AMOUNT";A$
130 IF A$="P" GOTO 160
140 IF A$="L" GOTO 230
150 GOTO 110
160 INPUT"[DOWN,SPACE9]
    AMOUNT OF THE LOAN";P
170 GOSUB 310
180 F=(INT(P*(D/C)*100))/100
190 PRINT"[DOWN]THE MONTHLY PAYMENT
    FOR A $";P;"LOAN"
200 PRINT"AT AN INTEREST RATE OF";X;
    "%"
210 PRINT"FOR";Y;"YEARS IS: $";F
220 GOTO 380
230 INPUT"[DOWN,SPACE4]
    MONTHLY PAYMENT DESIRED";G
240 GOSUB 310
250 F=(INT(G*(C/D)*100))/100
260 PRINT"[DOWN]AT AN ANNUAL INTEREST
    RATE OF";X;"%,"
270 PRINT"A LOAN AMOUNT OF $";F;
    "IS POSSIBLE"
280 PRINT"WITH A MONTHLY PAYMENT OF
    $";G
290 PRINT"FOR";Y;"YEARS."
300 GOTO 380
310 INPUT"[DOWN,SPACE2]
    YEARLY INTEREST RATE IN %";X
320 INPUT"[DOWN]NUMBER OF YEARS TO
    PAY BACK";Y
330 I=(X/100)/12
340 N=Y*12
350 C=(1+I)^N-1
360 D=I*((1+I)^N)
370 RETURN
380 END
```

The Money Machine: Money left in my children's pockets and piggy banks tends to disappear. If I hold the money for the kids, I tend to forget who is owed what.

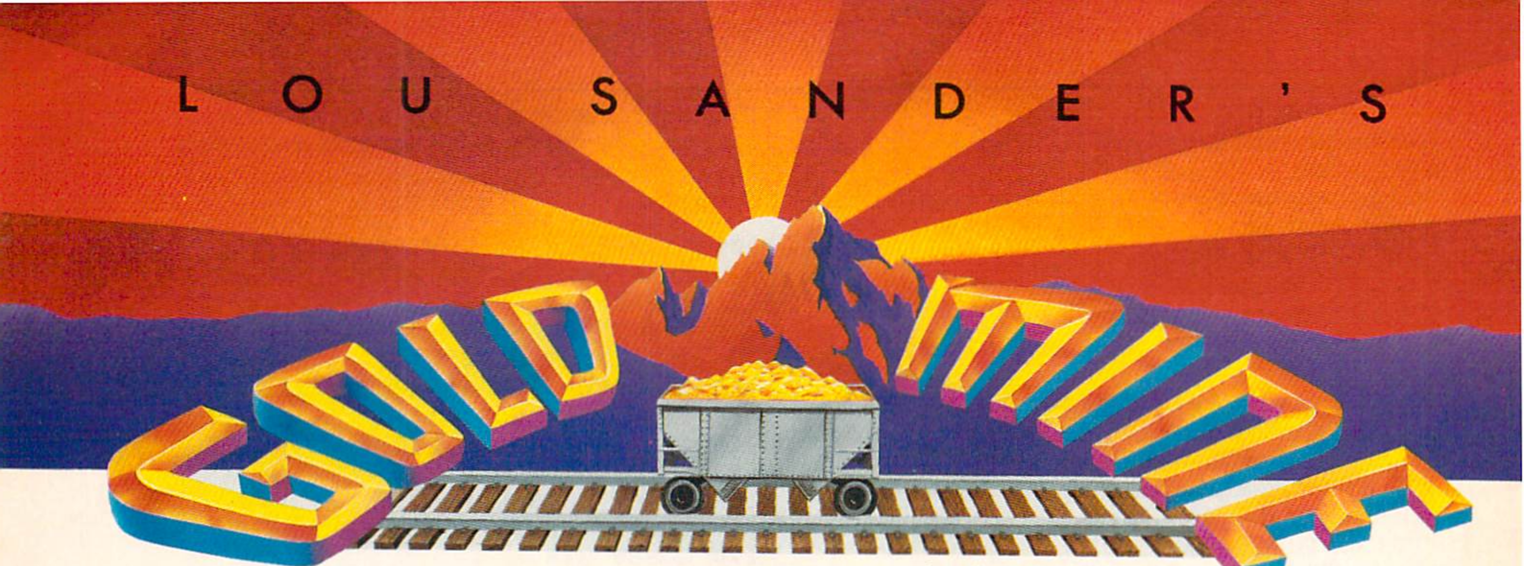
This program solves the problem by emulating the popular 24-hour banking machines. It creates a disk file for each child, and allows checking of balances at any time. Deposits and withdrawals require a code known only to Daddy.

To create a new account, enter your account number as 000. Follow the screen directions, creating a file with any three-digit number the child will remember. Thereafter, the account is accessed by entering that number.

Deposits and withdrawals will not be accepted unless the information is followed by the "change code" that is found between the quotes in line 330. You can alter the code by changing that line.

R. Gregory Shaw
Fayetteville, NC

Continued on page 84



Compiled by Louis F. Sander

Here are more great game tips for you. Since many of these games are available for the 64 and Amiga, there's a slight chance that a given tip may not work on your own machine. But from all we can tell, most of them work on any machine, whether it be from Commodore, Apple, Atari or IBM.

Of course, since so many games and machines are covered, there's no way we can test every tip that we print, so there may be some fool's gold among all these nuggets. And don't overlook the fact that many tips require skill as well as knowledge.

Send your own Commodore game tips to:
The Gold Mine
P.O. Box 101011
Pittsburgh, PA 15237

Use a separate sheet of paper for each game, and combine all tips for one game onto one sheet. If your nugget is printed, you'll get a check for $5, plus fleeting fame around the world. Your mother will get another reason to be proud of you. Gold Mine Rules!

1985: The Day After: Use as much fuel as possible, but avoid running out. This will get you more points.
Curt Holstein
Fairmount, ND

Adventure Construction Set: On any adventure, when you are just starting out and firing a missile weapon, approach your enemy diagonally. This improves your chances of hitting him and quickly improves your missile skills.
Joseph Sweely
Pennsauken, NJ

Agent U.S.A.: If you don't have a ticket, you can still board an old train by getting on at the last second.
Mike Oehlers
Toledo, OH

Airborne Ranger: When dropping your aid packs, drop them all fairly close together, preferably in an open area near a trench. This allows you to get your maximum artillery and your four First Aid packs, which are crucial at the higher levels of the game.

Whenever possible, use time bombs on military targets. This lets you conserve your LAW rockets so you can use them on bunkers and other things that can kill you (even men).
Tony Zimbricki
Lewisburg, PA

Auto Duel: If you get stuck on a road between towns and have to walk, find a farm surrounded by a fence. Then find a place where a long fence meets the fence around the farm. If you look closely, you'll see a crack big enough for you to fit through.
Bill Kerr
Address Unknown

The Bard's Tale I: To keep the Crystal Golem from reforming, you must kill him with the Crystal Sword.
Greg Hall
Brentwood, TN

The Bard's Tale III: If you're having trouble with the spells in Gelidia, they are as follows, all in order for each tower.
Crystal Tower: LEVI, ANMA, PHDO
Black Tower: GRRE, SHSP, FEAR, SUEL, SPBI
Grey Tower: INWO, WIHE, FOFO, INVI
At Lanatir's Blood, type in CALA.

To get the Rainbow Rose in Lucencia, get the blood of the Rainbow Dragon in some kind of container and use it on the flowerless rose bush.

To find Sceadu in Tenebrosia, get the Shadow Lock in Shadow Canyon, collect some tar in the Tar Quarry, use the tar on one of the trees surrounding the Pit in the forest, then use them both in the Middle of Nowhere.

In Tarmitia, type TYR, then WERRA at the Who Am I in Berlin. But Werra isn't the main problem in this dimension, the Black Slayers are. And don't worry about the Strifespear; it's in the next dimension with the dead Hawkslayer.
Contributor Unknown

Blueprint: You can avoid bombs by starting at the top houses and working your way down. When you're trying to get all the pieces to a puzzle, only go into each house one time. Going in twice can get you a bomb. Also, each house will contain only one piece of the puzzle.
Wes Miner
Merrimack, NH

Centipede: Get close to the spider before you blast him. If you're close enough, you'll get 900 points instead of 300.
Brandon Kane
Willowdale, Ontario
Canada

Delights of the Mou Tai Masters: When socializing with people you want to impress, introduce them to every computer guru you know. Then take the whole crowd to a fine oriental restaurant.

When the final course has been served, treat the party to a round of exotic after-dinner drinks. (The bottle of the "good stuff" resembles an American household product.)

Smile knowingly as your companions savor the delicate taste and attractive fragrance of your gift.
J. Margerine Meadow
Toronto, Ontario
Canada

Duel: A faster way to kill your enemies is to stand on the platform where they come up. When they come up, sit on them immediately, easily getting from 500 to 1000 points!
Howard Weisbaum
Address Unknown

Express Raider: To defeat the man throwing bottles, duck with every throw. Inch toward him kicking, and he will go down very easily. Similar tactics work on the man with the gun.
Joe Page
Moville, IA

Falcon Patrol II: Load the program, use your reset button to reset the computer, then enter

POKE 16938,6 : SYS 2087

This will protect your aircraft from the flak and collision with enemy helicopters. Enemy missiles can still hit you.
Tai-Wei Wan
Bangkok, Thailand

Ghostbusters: Spend your money wisely! It is more economical to buy ten ghost traps for a total of $6000 than to buy a ten-ghost portable laser confinement system for $8000. Why pay more money for the same capability?
Chris Hinton
Oconomowoc, WI

Gorf: To get 127 ships, load the program then enter

POKE 33094,127
SYS 64738

Jason Dishop
Huntsville, OH

Great American Cross-Country Road Race: In the U.S. Tour, try different routes until you find a shorter one than the one in the "records." It assures you of finishing first.

I've found at least one way each time.
Chris Kruegel
Franklin, WI

Heart of Africa: When you find a deposit of gold, copper or the like, pick up three bags. When you give them to a chief, the first will usually get you a clue (*if* he knows about the lost tomb). The second will probably be greedily snatched up, but the third will make you an honored friend. Honored friends get food and canoes for free.
J. Waldman
New York, NY

Imagic Tennis: When you play against the computer on the Pro level, try pulling his serve cross-court. It usually beats him.
Scotty Scott
Nashville, AR

Jungle Hunt: When you are in the river, swim near the bottom to avoid alligators. Surface quickly whenever you need air.

When jumping over the rocks, you can get greater speed by using a running jump: stay to the left, and move to the right when a rock comes.
Cory Moore
Westlock, Alberta
Canada

Jungle Hunt: To finish the first board, keep your eye on the vine you are going to swing towards. As it flies in your direction, jump. Don't worry about aligning the two, as it only wastes time.

When you hear the bubbling sound on the second board, get some air and dive for the bottom. You'll pass the bubbles and save time.

In the third round, the best place to stand is between the middle and the far right. From that position, press the button while pushing forward on the joystick. This makes the player jump higher—even high enough to jump over large boulders.

On the final screen, you can get a higher jump by pressing the button while pushing your joystick diagonally up and to the left. The best way to complete this screen is to jump between the natives, wait until the girl is low enough, then jump over the last native.
Sean Curry
Cynthiana, KY

Kid Niki: Each level has a secret entrance to Cloudland, where you can earn an important prize. On the second level, kill the last attack bird to get a hack-ball, which is very helpful later on.
Contributor Unknown

Law of the West: It is very important to get off on the right foot with the Doctor. To do so, say these things:

1) My, aren't we hung over this morning?
2) I've had my share of hangovers too.
3) Only time.

When you are shot he will heal you, but only twice. The third time he will pass out.
Justin Stephenson
Evansville, IN

LeMans: Keep your car on the left part of the street, and you won't hit any other cars.
Roberto R. Gonzalez
Nuevo Leon, Mexico

Lords of Conquest: When choosing countries, take the ones with the riches. This will help you buy weapons, cities and boats.
Matt Jylha
Address Unknown

Maxwell Manor: On Level 93 you can get all three things (sword, gun and shield) on the road.
Mike Cramer
Redding, CA

Continued on page 85

Reviewed by Scott A. May

Project Firestart

Computer: Commodore 64
Publisher: Electronic Arts
1820 Gateway Drive
San Mateo, CA 94404
(415) 571-7171
Price: $29.95

"Death is when the monsters get you."
—*Stephen King*, Danse Macabre

Horror fans haven't had much to howl about when it comes to computer games. Occasionally a grisly title would drip through the cracks, such as Synapse Software's classic *Mindwheel* or Infocom's grim tribute to H.P. Lovecraft, *The Lurking Horror.* Usually we've had to make due with the darker realms of fantasy, science fiction and mystery.

No more. Electronic Arts and Dynamix *(Arctic Fox, Caveman Ugh-Lympics)* finally give horror aficionados a game we can sink our teeth into. *Project Firestart* almost redefines the genre, emerging one of the first true examples of "splatterware." If this sounds dangerous to you, read no further.

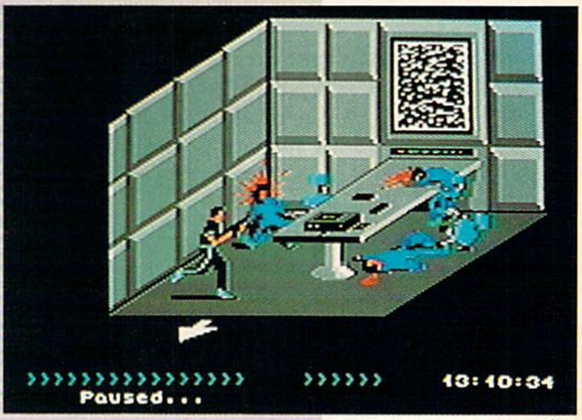
The first thing you'll notice about *Project Firestart* is the manual—there is none. This alone should be enough to make the hairs on your neck stand at attention. Instead we are offered only a brief summary card outlining the game's scenario, player commands, maps and a few hints. It's like entering a deserted old house without a flashlight, or at least one with a very dim bulb.

Load the first of two disks (four sides in all) and prepare for your first excursion into terror—EA copy protection! It's okay, don't panic. Simply reset your computer and try again, this time disengaging all cartridges and auxiliary disk drives. And stop that incessant screaming.

Truth be told, the game loads in a jiffy, greeting you with a picture of a spaceship's command console. A coffee mug sits idly by a computer keyboard. The static-filled monitor suddenly clears. Numbers flash, then a man's head appears on the tiny screen. He's saying something—"Come in Prometheus . . . come in . . ." A large, dark figure moves into view, as if responding to the call. You can tell by the shape that this creature is decidedly *not* human.

It's time to send in a foolish, um, we mean *brave* young adventurer to uncover the awful truth. That's you, by the way.





This creepy teaser ushers in the game's movie-like opening credits, punctuated by Alan McKean's highly disturbing music and sound effects. Press the joystick button to begin this one-player nightmare, or sit back and watch the on-disk introduction unfold.

The year is 2061. The place is the *Prometheus,* a research vessel in orbit around Titan, a moon on the edge of the great belt of Saturn. The *Prometheus* is employed by the System Science Foundation (SSF), a division of the United System States (USS), to produce a new species of creatures to help Belters mine hazardous moons and asteroids.

The experiments, which include first-generation genetic reshaping, seem to have been running smoothly. But now *Prometheus* fails to answer sub-space messages and we fear the worst. It's time to send in a foolish, um, we mean *brave* young adventurer to uncover the awful truth. That's you, by the way.

As space agent Jon Hawking, you have been enlisted by Chief Ricker of the space station Uquenque to board the *Prometheus,* retrieve the science log and set the ship for self-destruct. Oh yes—and get out alive, if possible.

As the game begins, players enter the *Prometheus* from a Level 1 shuttle bay. From this point you have only two hours (real time) to accomplish the mission. Otherwise, the self-destruct sequence will be initiated by remote control from the Uquenque. Just what you need, bureaucrats breathing down your neck.

The game's large, colorful play area fills the entire screen. Likewise, your alter ego

Continued on page 49

You Can Run But You Can't Hide:

Hints for Surviving *Project Firestart*

- Carefully examine all objects in a room by slowly walking the perimeter. On-screen prompts will alert you to objects that can be manipulated. Pause the game often, taking notes of each room's special attributes and security requirements. With time, the pieces will all fit into place.
- Access the *Prometheus* computer often and scan the Firestart Notes. There you'll read how the creatures were bred to be the genetic cross between oxen and asteroid belt fungi. Whoa! Break out the room freshener! Discover how and why the first specimens died. Use this to your advantage.
- Search the Engineering department for the plasma laser. It's faster and more powerful than ordinary lasers. Just be careful where you point the thing.
- Pay attention when the screen fades to reveal simultaneous activity on the ship. Remember: You are *not* alone. Move quickly to rescue the girl from her cryogenic tomb. Wait for her to follow before exiting a room. Heed her advice and watch out for Annar.
- Visit the Med Lab to revive lost hit points.
- Keep your survival options open, especially when it's time to get the heck out of there. Keep your eyes open for alternate exit routes. Phone home often, unless you *like* drifting aimlessly through space.

Reviewed by Mike Rivers

Navy SEAL

Computer: Commodore 64*
Publisher: Cosmi
431 N. Figueroa
Wilmington, CA 90744
(213) 835-9687
Price: $29.95

Navy SEAL is a unique combat arcade-simulation from Cosmi, in which you assume the role of an underwater demolition expert engaged in covert operations. A variety of combat situations, unusual graphics and underwater hazards combine to produce an entertaining and challenging game based on the elite Navy SEAL (Sea, Air and Land) Division—arguably the armed forces' most extraordinary unit.

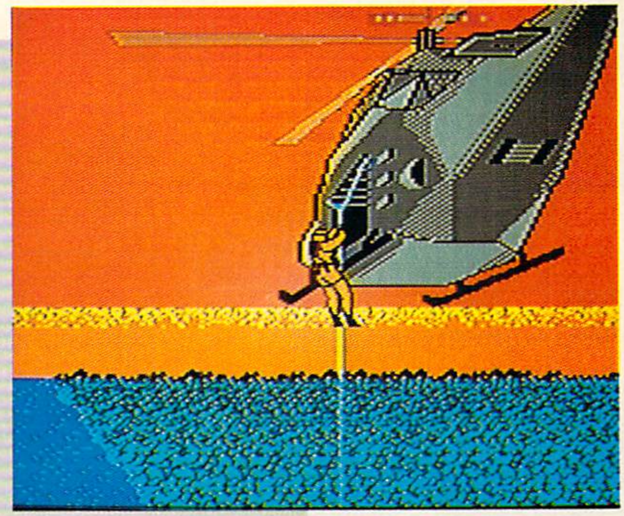
The game is divided into two sections: training and operations. The purpose of the training section is to "ascertain the applicant's general fitness and ability, and to define any specific areas of potential development"; primarily, this gets you acclimated to the player interface. Training is further subdivided into four sections: marksmanship, the on-land obstacle course, the underwater obstacle course and rock climbing.

During marksmanship training, you are on a beach armed with a machine gun. As you control the man on the field, target boards appear at random. You fire at will and try to hit as many boards as possible while using the least ammunition.

The scrolling in this part of the game is particularly interesting. Instead of moving the entire background left and right, the area representing the beach scrolls at varying rates, from the foreground back, creating an appearance of depth on the screen. To gain the highest rating, you must hit more than 90 percent of the targets, each with a single shot.

During the on-land obstacle course, the trainee, while being chased by a utility vehicle called a half-track, runs along a beach while being shelled by mortars. To keep ahead of the half-track, you must dive (by hitting the F7 key) when you hear the sound of an incoming mortar round. If you do not dive in time, you are stunned by the round, and the half-track catches up with you. For the highest rating, the course must be completed in under two minutes with no "hits" from the mortar.

If you survive the infiltration phases of the missions (which is no mean feat) you proceed to the target phase.



The underwater obstacle course is deceptively simple compared to the underwater segments of the missions. Here, a surface craft launches logs which you must dodge effectively in order to receive a high rating.

In rock climbing, the final phase of training, you guide the SEAL trainee up a sheer rock face along cracks and fissures (represented by darker areas in the rock). You must follow the cracks up the face in order to reach the top within a certain time limit, in order to receive a high rating.

The training phase can be repeated to improve the players' rating. Or you can skip the training altogether if you like, and proceed directly to the main section of the game—the missions.

There are four missions to undertake, code-named: "Godzilla," "Loch Ness," "Moby Dick" and "King Kong." Each is subdivided into two or more of five phases: insertion, infiltration, target, exfiltration and extraction.

In operation "Godzilla," you make a HALO (high-altitude, low-opening) parachute drop from a C-130 transport, and swim one mile to an enemy munitions depot. There the objective is to plant timed charges synchronized to go off simultaneously, but be sure to leave at least fifteen minutes for escape.

"Loch Ness" involves a sunken Polaris sub containing armed missiles. You are dropped from a carrier-launched helicopter and must swim to the sub using a homing device. Once found, you enter the sub and disarm the missiles.

Operation "Moby Dick" features an oil rig that has been converted into a chemical weapons plant by a hostile government. You are placed one mile from the platform by submarine. Once you reach the rig, you place six limpet mines on the platform pylons. You then surface and enter the station, the object being to search for documents proving the true purpose of the installation.

In "King Kong" a helicopter places you down-river from a secret Central American "renegade" base camp, where the American ambassador is being held hostage. Your job is to rescue the ambassador as stealthily as possible.

During missions, the function keys provide special controls. F1 reloads the selected weapon on land and allows the diver to surface while underwater. F3 cycles through weapons. When F3 is pressed, the next weapon is displayed on the status bar at the top of the screen. Weapons for which there is no ammunition are unavailable on the status indicator. F5 furnishes a close-up function for setting timers and arming or disarming missiles. F7 activates a quick evasive maneuver both underwater and on land. RUN/STOP pauses the game.

The "infiltration" phases of play feature such hazards as sharks, Barracuda which

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Also available for MS-DOS machines.

Reviewed by Jack Emberly

The King's Rule

Computer: Commodore 64
Publisher: Sunburst Communications
39 Washington Avenue
Pleasantville, NY 10570
(914) 769-5030
Price: $59.00
Ages: 8–Adult

Mystery fans can be impetuous problem solvers—the first to say "the butler did it." Similarly, all of us are inclined to make hasty conclusions before doing our homework. For example, look at the following number sequences and predict the pattern or "rule" governing the sequences:

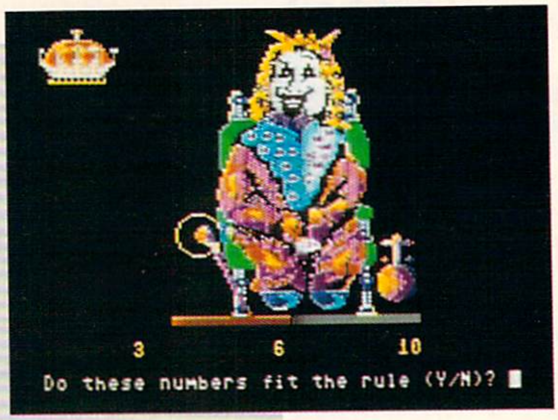
2-4-6
4-6-8
10-12-14

Looks like "three consecutive even numbers," doesn't it? If we are told that's not the rule, most of us would stubbornly restate the conviction in different words. "OK," we'd say, "the first is even, the second is two more, the third is two more than the second." After all, what else could it be?

Actually, the rule here is simply *three ascending numbers*. We might overlook that possibility in the face of data that hints so forcibly at "three consecutive even numbers." For that reason also, most of us seldom submit our original notions to stringent tests. Consequently, in the above riddle, few would ask if sequences such as 2-4-5 or 4-8-12 also fit the pattern. They do, of course, but to ask such probing questions at the beginning of problem solving presupposes a habit of forming more than one theory initially. This open-minded method is the thinking style one would expect to find among executives of the Ideas and Innovations Division of IBM. It should also become a consistent teaching objective of responsible parents and teachers.

The King's Rule maintains that greater divergence in the problem-solving approach can be developed through riddles involving sets of three numbers containing a hidden pattern or rule. Here, one trains to avoid pursuing the hastily made, and often incorrect theory in favor of brainstorming a comprehensive set of possible solutions each of which is systematically evaluated. This is an approach that can and should be learned by children. Once internalized, this method of thinking is bound to make better thinkers of anyone from grade three to adult.

Problems at the easiest level are appropriate for average grade three kids. Those at the highest level may frustrate the brightest adults.



The Program

The program format is the familiar game in which one works progressively through six rooms of a castle by disclosing patterns for number riddles. A key of the patterns or rules employed by each level is available to the teacher in documentation. (Consider giving slower kids a copy of the list for difficult levels. Doing so won't give them the solution, but it will help focus their thoughts. In this way they will benefit from analysis and evaluation practice without becoming discouraged.)

Entrance to the game is the Castle Gate where the simplest patterns are found. Subsequent levels include (in order of difficulty) the Guard's Room, the Game Parlor, the Magician's Study, the Royal Suite, and the King. Problems at the easiest level are appropriate for average grade three kids. Those at the highest level may frustrate the brightest adults.

Play may be initiated at any level from the main menu, but the standard approach is to begin at the simplest level and work upward. An option allows the adult to open and close specific levels.

The procedure followed remains relatively constant for all levels. In succession the player attempts to solve three number quizzes. For example, in the Castle Gate, the easiest level, the first quiz might be to discover the rule in the number set 13-7-1. Most kids will quickly guess "three descending odd numbers" or simply "descending numbers." The main educational aim of this program is to acquire the habit of generating several possible theories as a first step in problem solving. As they begin this program most children will not do this. Instead, they'll focus, more or less exclusively, on the most obvious possibility. That's no problem. Because success depends on the more thoughtful approach, thinking habits will change as the game is played.

After a theory is formed, the next step is to test it by entering three different numbers which follow the same pattern. For example, the player may now enter another series such as 11-8-2. If this second set does indeed fit the hidden rule, the word *yes* appears next to the series entered by the player. Players can continue to invent similar sets of numbers to elicit yes or no responses until they are confident they have found the hidden rule. At this time, the program feeds them five new sets of numbers. Each of these must be evaluated by the player who indicates whether they conform to the pattern (types "y" for "yes") or don't (types "n" for "no"). Evaluating all five correctly returns the player to the second and third quizzes (new number sets) which must also be successfully analyzed. Succeeding to unlock all three puzzles produces a "key" to the

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Reviewed by Russ Ceccola

Wooden Ships & Iron Men

Computer: Commodore 64
Publisher: The Avalon Hill Game Company
4517 Harford Road
Baltimore, MD 21214
(301) 254-5300
Price: $35.00

Strategy games, historical games and war games have steadily improved over the years. In their early days, you would get bored easily because the games were nothing more than "move-and-fire" machines in which the computer resolved all movement and combat questions. Now, the games are much more complex. Instead of "move-and-fire" scenarios, the games involve many more options and require creativity.

Such a game is Avalon Hill's computer adaptation of their popular board game, *Wooden Ships & Iron Men.* This game involves ship-to-ship conflicts in the days when hulls were made of wood, the wind was a major factor and battles were fought on the high seas.

In *Wooden Ships & Iron Men,* you command a fleet of up to 20 ships of many possible nationalities and classes and crews with morale ratings of poor, green, average, crack or elite. The 26 scenarios that come with the game cover the years between 1776 and 1815—the Revolutionary War and Napoleonic Era. In addition to these scenarios, you can create your own maps with the Dockyard program that's included. All fleets and maps that you create can be saved to disk.

All options in *Wooden Ships* are entered by pressing the fire button on the joystick or the space bar. You also use the joystick to scroll through menus or press certain keys on the keyboard to achieve the same effect if you so desire.

Wooden Ships relies on a number of "phases" for game play. In all, there are a maximum of 12 phases per turn, with a menu bar between turns that allows you to quit, save the game or continue.

The first phase is the Wind phase. In it, the wind may change direction. There are two ways in which you can see the wind's direction. If the wind shifts, text will pop up on the screen to tell you so. Also, there is a pointer/arrow called a "windicator" used to select ships in the play field; it points in the direction the wind is blowing. The Wind phase requires no user input and only appears in a turn when the wind shifts.

The 26 scenarios that come with the game cover the years between 1776 and 1815—the Revolutionary War and Napoleonic Era.

The second phase, the Unfouling phase, takes place only if two ships are enfouled. Players simply choose whether they want to attempt unfouling in that turn.

In the two Movement phases (one for each player), you determine how many times a ship may turn and how many hexes it will move. Ships take up two hexes on the map. When turning, the stern swings around. An overhead view of the water, shoals and land involved in the scenario is provided.

The graphics aren't exceptionally good and, in fact, the same piece is used to represent all of the ships. Care should have been taken to make small ships take up one hex and larger ships take up as many hexes as necessary to reflect their size.

In any case, both fleets enter movement commands for their ships during their respective Movement phases. Because both players enter their movement commands from the same computer and monitor, the second player is required to turn his head while the first person enters his commands and vice versa. I found this to be somewhat awkward at times, but I guess that is the only way to really pull this off. After making their choices, each player has the ability to anchor the ship, pull up the anchor or cut the anchor in the Anchoring phase. Now the action really begins. In the Movement Execution phase, each ship moves step-by-step simultaneously until all movement points assigned in the Movement phases are gone.

If two ships wind up in adjacent hexes after the Movement Execution phase, a Grappling phase occurs in which the ships can try to grab onto one another. If a grappling phase takes place, the players can move into a Boarding Preparation phase in which boarding parties (offensive or defensive) are formed.

The Combat phase takes place after boarding or movement (depending on the proximity of the ships). In combat, each player decides which ships will fire broadsides and which will fire their guns. Immediately following the normal Combat phase is the Melee phase that involves the boarding parties and their fights. Three rounds of melee combat occur in the Melee phase, and only the results are printed on the screen—there is no player intervention.

Finally, two phases can be entered: the Load phase and Sail phase. In the Load phase, each player can load their guns and cannons with round shot, double shot, chain shot (effective only against enemy rigging) or grape shot (effective only against enemy crew members). In the Sail phase, each player chooses full sails (faster ship) or battle sails in preparation for the next turn.

These 12 phases can be repeated each turn. Again, certain phases like the Wind phase only occur if the tactical or nautical conditions require it.

When all of one side's ships are captured or sunk, the game is over and a victory screen appears. Victory is determined by the amount of prize money won by each side. Captured ships are worth 3000 pounds sterling for each gun and carronade left on board, and sunken ships are worth ten percent of the amount of pounds sterling equal to 3000 times the number of guns and carronades.

Wooden Ships takes care of all calculations for the player. All that is required is careful strategy. By choosing Get Status—an option on every menu—you see all characteristics of the selected ship. Each ship has a name, nationality, crew morale rating, class, number of movement points for both full and battle sails, number of times you can turn the ship in a game turn, hull points, load type on each ship side, number of crew points in three different "watches," number of gun points, number of carronade points and number of rigging points. These points are important factors and specifically determine the outcome of battles.

Every time you move ships in your fleet, you should try to arrange them so that after movement, their broadsides will be facing the enemy to inflict maximal damage. You must take into account drifting, wind direction and enemy movement.

Be prepared for combat—keep your guns and cannons loaded, so you can always let loose a round of fire against the enemy ships.

Continued on page 42

Reviewed by Gary V. Fields

Sketchpad 128

Computer: Commodore 128 with 1351 mouse
Publisher: Free Spirit Software, Inc. 58 Noble Street Kutztown, PA 19530 (215) 683-5609
Price: $29.95

Those of you who have been looking for a 128 graphic editor which takes advantage of the computer's 80-column display need look no further—*Sketchpad 128* is here.

Designed around a simple but intuitive interface and the 1351 mouse, this artist's aid allows the user to point, click and draw graphics on a canvas 640 × 200 pixels large. With a click of the right mouse button, the program toggles between the main menu, pen size/shape menu and the drawing screen. Hold down the left button and move the mouse to trace a line on screen using the selected pen shape. In an effort not to cramp any artist's style, the program comes with 15 pens of varied sizes and shapes, plus an air brush, fill option, text, lines, boxes, circles, arcs, rays and even three-dimensional shapes. It also comes with an option which will scroll the screen from right to left (for animation backgrounds) and a slide show module which lets you flip through screens in the same way you would change slides in a traditional projector.

Sketchpad is super easy to use. All the options appear on screen on a large clipboard menu. To select a feature, simply click on the option or pen you want and then click in the working area. Because of this intuitive design, it is very easy to create both simple and complex images in a very short time. The program includes options to draw lines, boxes, rays and circles, as well as draw freehand. In short, any object you can see or imagine can be produced on the screen.

To use *Sketchpad* you must use a 1351 mouse—it will not work with a joystick. Because I have become accustomed to using a mouse in the past three years, I appreciated the use of this input device, as it offers more accurate control over the pointer. If you want to add text to your image, just click on the word *Write* on the clipboard. To change the size of the type, you click on the word *Size* and select any size between one and five. This adds a lot



of potential for those who want to create posters. The larger size type allows 80 characters on the page, but you can squeeze 2000 of the smaller fonts on the same screen. And, of course, the five type sizes can be mixed.

One of the most attractive features of *Sketchpad* is its ability to create and rotate solid, three-dimensional images: sphere, donut, spool and cylinder. To use one of these in your design, you just select 3-D from the options menu and then chose the shape you want. Additional options, appropriate for the object will open. So to define the object's size, viewing angle, texture and the direction of the light falling on it is as simple as pointing and clicking. I have to applaud Free Spirit and the programmer for not only including three-dimensional objects, but for making them so easy to define.

While I found the program's interface easy to handle, I do criticize the location of the "Options Menu" between the "Clear Screen" and "Exit Sketchpad." It is very easy to accidentally select one of those two while in the frenzy of creation. No real harm is done, since a requester appears which prevents you from trashing your design, but the annoyance of the requester was enough to break my chain of thought. I would prefer those two options move far away from the regular creation menu so I couldn't select them unless I really intended to.

I was happy to see the program will work on the original 128 without the 64K video chip. But if you own a 128D or have installed a 64K video chip in your older computer, the program automatically recognizes that enhancement and offers more options like: RAM picture lock, grids, patterns and a pixel editor which magnifies up to eight times.

At this writing, the program's greatest weakness is printer support. While it will handle many of the more common nine-pin printers (Epson, Gemini, Star, Cannon, etc.), it did not offer direct support for my favorite 24-pin Star printer. To get a satisfactory printout with it, I had to configure my printer interface to drive it as an Epson. This worked, but it did not output the quality hard copy I know the printer can deliver. Hopefully, new drivers will be added to the software in the future. But if the program does support your printer, getting it to print, like all of *Sketchpad*'s other options is as easy as point and select. You can select your printer from the print menu, but a more sensible approach is to scratch all but your own printer driver from the disk—the program defaults to the first print driver it finds on the disk. Next you simply click on the secondary address number, height and density and whether you want the image rotated when it is dumped to paper or not.

It's obvious that the developers wasted no money on the user's manual which is a puny eight pages in size. While it would be easy to criticize the documentation's brevity, the program is so easy to manage that no more of a manual is really required. But still, I must object to the inadequate printer support coverage. A single page of instructions is all that is offered. From personal experience, I know that getting the software and printer to shake hands is often the most frustrating task a computer user faces. And because most users of *Sketchpad* will want to print the graphics they create, more documentation on how to work around printer problems should be included.

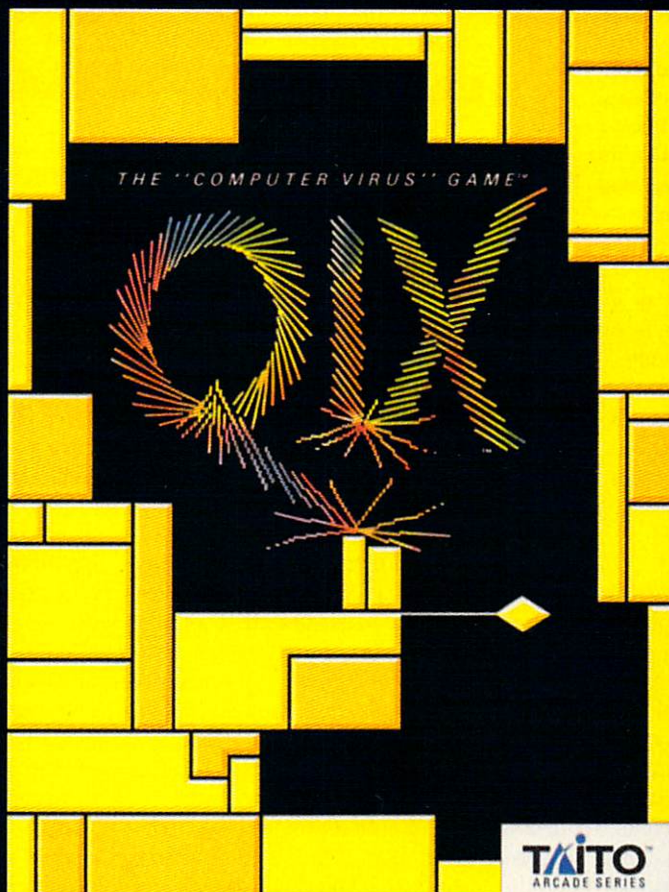
Sketchpad is not copy protected and can easily be copied to other disks including those used by the fast 1581 drive or even a hard drive.

Conclusion

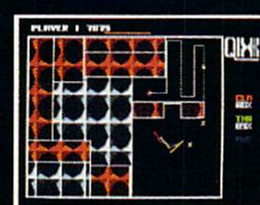
Sketchpad 128 is a good product at an affordable price. It takes advantage of system's 80-column display, employs a friendly interface, is intuitive in design and should satisfy the personal graphic needs of most users. Combined with a creative mind and eye, the program can help the user translate their graphic thoughts to the screen and paper without breaking the family budget. But because it lacks definable brushes, color fills, spare screens and other features required for commercial use, *Sketchpad* will be better suited for home, small office or educational use. *Sketchpad* has enough options to satisfy the needs of most casual users, without the financial investment the more professional graphic packages require.

VIRUS!

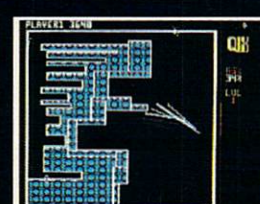
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Reviewed by John Ryan

Shogun

Computer: Amiga*
Publisher: Infocom/Mediagenic
3885 Bohannon Drive
Menlo Park, CA 94025
(415) 329-0500
Price: $59.95

If the name John Blackthorne means nothing to you, chances are you have never read James Clavell's gripping saga of sixteenth century Japan, *Shogun*. In fact, the mini-series spawned by the book became one of the most popular television sagas of all time. Now, in collaboration with James Clavell, *Shogun* has made its transition to computer medium. Long noted for their interactive text adventures, Infocom was well suited to bringing this story to that medium.

Shogun, along with several other new releases, marks Infocom's transition from the world of text to stories that include graphics. Considering that Infocom's founding father once spurned graphics because, in his words, "They can never compete with the imagination," *Shogun* will, indirectly or not, test for Infocom the murky waters of graphic interactive fiction.

Even though it is not a prerequisite for you to have read the book prior to playing *Shogun,* your success may be marginal at best without knowing the basic storyline. As a matter a fact, there are several areas within the story that will absolutely stump you unless you have had some prior experience with the plot of *Shogun.* You are John Blackthorne, the irrepressible English sea pilot, searching for the fabled Japans of the sixteenth century. With the help of a stolen Portuguese rutter, you have managed to thread Magellan's Pass, a journey which left your ship, the *Erasmus,* the sole surviving vessel. Once in Japan, you find yourself inexorably drawn into a political power struggle between two Japanese lords. As you try to adapt to the land and understand the customs, you'll find—as in all good stories—intrigue, drama, high adventure and plenty of romance—all successfully adapted from the original story.

As the story opens, the *Erasmus* is floundering in a vicious storm, and you must find a way to navigate through an approaching reef, or you and all hands will meet a watery grave. You have a limited amount of time in which to do this, so quickly discard the urge to dally about the ship and try to garner just enough information to make a educated decision on how to save the *Erasmus.* (In other words: think like a pilot!) Once you make landfall in the Japans, life will, for the most part, become a bit easier.

You'll find intrigue, drama, high adventure and plenty of romance—all successfully adapted from the original story.



The biggest mistake you can make is assuming *Shogun* is just another interactive adventure. Logic and common sense won't often work in a feudal Japanese society, where there exists a strict set of rules for each social ladder. Deviation from these rules of etiquette can mean swift death by the sword. You must play this game from the standpoint of John Blackthorne. Try to make decisions as he would. You'll find that the story faithfully follows the sequence set by the book. In essence, each chapter of the book is a scene in the adventure. If you progress far enough through a scenario, the scene will end, and if you solve a sufficient number of dilemmas in each scene, you'll be presented with an overall score and may progress to the next scenario. If not, you'll have to restart the scene—if you have saved it at some point. If not, you'll start at the beginning of the story!

As with all of Infocom's interactive fiction, you communicate with the story by entering plain English words and sentences. *Shogun* sports a massive vocabulary; rarely did I find an instance where the program could not understand a command. I did notice, however, that an unexpected command can cause the program to come back with a crazy response. For example, when I typed, "Pull Rodrigues to raft," I was curtly informed that Rodrigues did not appreciate the action. This is no big deal in itself, except that Rodrigues was nowhere in the scene to begin with. You'll find several instances of this type of unruly parser behavior throughout the story—so keep your input intelligible.

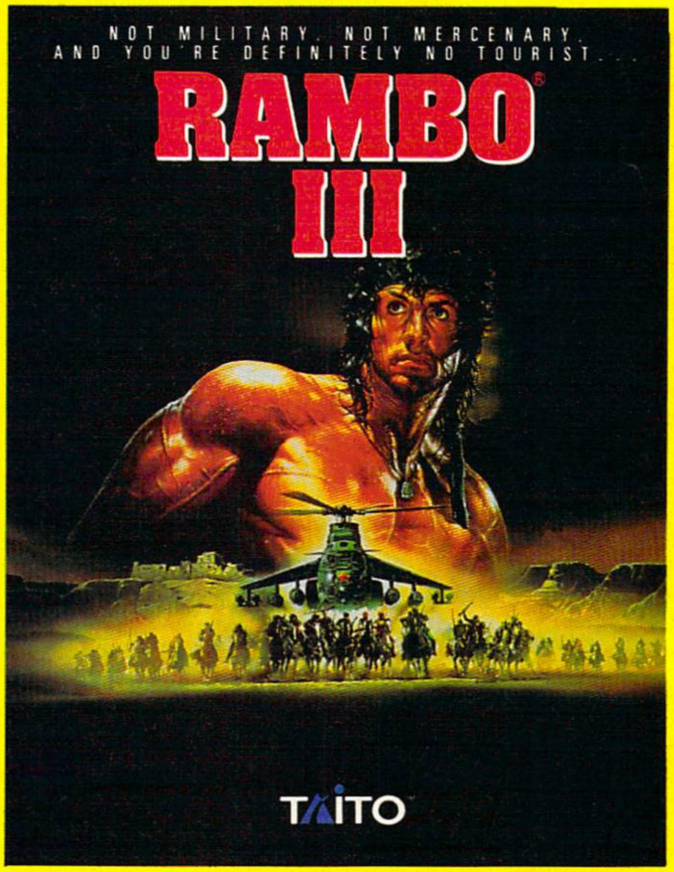
Shogun's illustrations are presented in stylized sixteenth century fashion and are meant to express the traditional art form of the time. The illustrations are nicely done and do a good job of validating the oriental flavor of the game. Disk accesses (and pauses in the action) are minimal. Personally, I found the game immensely enjoyable, even without the graphics, so I remain skeptical about whether or not the inclusion of graphics in an adventure is important, especially as they relate to *Shogun*'s text, which is well written, interesting and extremely absorbing.

One of several nice features new to Infocom programs is a "hint" command. Unlike most adventures, which may include a cryptic code book to garner clues from, *Shogun*'s hints have been incorporated into the game itself, available at the press of a key. Don't worry, you won't be given an answer outright. The hint page will display a list of "chapters." Once you select the chapter you're currently having problems with, another list will appear, detailing common dilemmas you'll find in a particular chapter. You can then bring up from one to several hints on each of the puzzles. These hints range from useless, to

Continued on page 69

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Reviewed by Mike Rivers

Baal

Computer: Amiga*
Publisher: Psygnosis Ltd.
U.S. Distributor: Computer Software Services
2150 Executive Dr.
Addison, IL 60101
(312) 620-4444
Price: $29.95

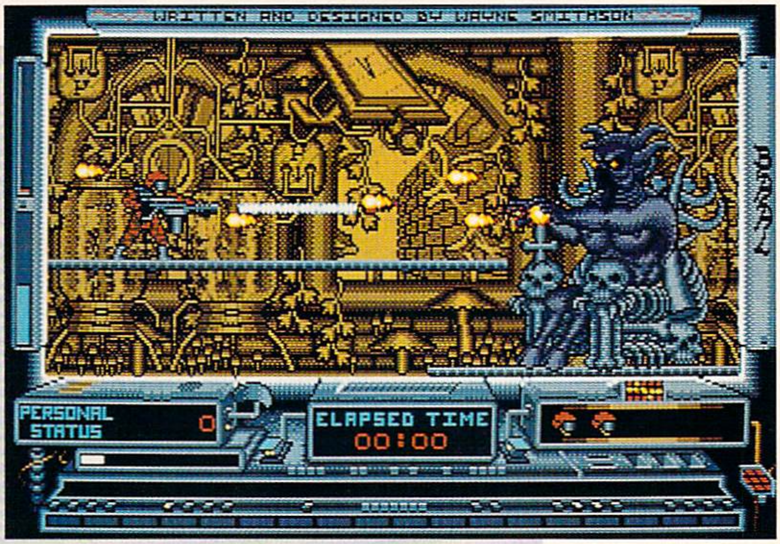
"This game is tough." That's what it says on the cover of the instruction manual of *Baal*, an arcade game from Psyclapse, a division of Psygnosis Ltd. They're right, it is tough. Enter an unearthly world of inconsiderate demons, blood-curdling screams, danger and noxious stenches from the underworld. Sounds like your old high-school? Could be, except *Baal* is a lot more fun. It's another in a series of 2D "climbing maze" shoot-'em-ups with the distinctive look that has become Psygnosis's hallmark. The graphics by Jeff Bramfitt, with design and art direction by Roger Dean, ensure that Psygnosis games always look great next to your Yes record albums.

The premise of the game puts the player in the role of an archaeologist who has discovered the underground lair of an ancient malefic deity named Baal. Baal has stolen the parts to an ultimate weapon called the "War Machine" which will allow him to rule or destroy the entire world. You become a Time Warrior in order to enter his domain, retrieve the pieces of the War Machine and then destroy him.

Baal uses the classic "figure out how to turn off the force field at point A before gaining access to point B" puzzle-form, with plenty of *really* annoying monsters and land mines along the way. You can move between sections of the puzzle by means of a rocket pack which you pick up at any of the inconveniently located "launch pads" on every screen (the launch pads are actually out-of-order telephone booths). Or, you can travel down between levels by falling to your death (inelegant, but useful in some circumstances).

En route to the conclusion of the game you must collect fuel for the rocket pack—a total of 18 War Machine parts and laser cartridges. You must also blast monsters and generators (of course!). Lasers can be refueled at any of the hard-to-find refueling pumps throughout the game.

Monsters run the gambit from wimpy to really dangerous with mildly annoying in between. *Baal* features slime-spitting floor-snakes (easy), slime-spitting flying lizards (unpredictable), slime-spitting purple frogs (slow, practically indestructible and extremely annoying; when you get a #2 cartridge you'll really appreciate being able to vaporize these guys!), slime-spitting jackals (if you don't have the higher-powered cartridges—run!), fire-spitting gargoyles and a host of others.



Baal has stolen the parts to an ultimate weapon called the ''War Machine'' which will allow him to rule or destroy the entire world.

All monsters reduce your energy level, so they must be taken seriously; if you touch any of them, you will explode leaving behind a cute little mushroom cloud. Confrontations with monsters are usually preceded by land mines, which you must somersault over. Monsters and demons usually have to be blasted several times before killing them, and they seldom stand still for that. Some require the higher-powered laser cartridges and several blasts in the snoot to be dispatched. Even after that, they may reappear if you walk to the opposite side of the screen and back.

The playfield is quite large, and includes over 250 screens consisting of platforms and ladders with a grotesque subterranean background. The screen includes indicators for Rocket Fuel Level, Laser Fuel Level, Personal Status (Score), Personal Energy, Elapsed Time, Active Time Warriors (Lives), Information, Parts Collected and X,Y coordinates.

The game is so extensive it requires careful mapping using the coordinates to maneuver accurately while your rocket fuel lasts. You will need to know exactly where you are going and what's there when you arrive in order to complete the game. If you run out of fuel before reaching a launch-pad, you explode. Two fuel canisters can be found at nearly every level, but it's a good idea to leave one behind in case you want to return to that level. Fuel is not accumulated if you reach more than one canister.

You start the game with six Time Warriors. In about two minutes you realize that you won't be able to complete the game with so few lives (an extra warrior is added every 5000 points). So what can you do? It turns out there's a way to generate extra warriors. At location 08–49 there is a laser refueling pump and one of those monsters that keeps reappearing if you walk to the side of the screen. By refueling

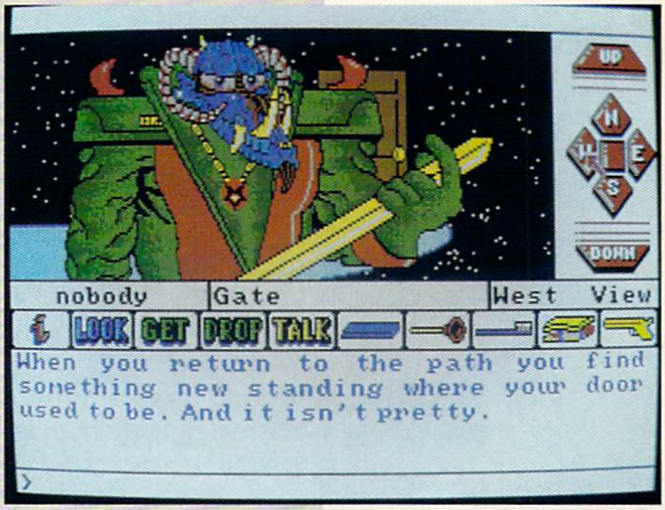
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Reviewed by Gary V. Fields

Dream Zone

Computer: Amiga*
Publisher: Baudville Software
5380 52nd Street SE
Grand Rapids, MI 49508
(616) 698-0888
Price: $49.95

In *Dream Zone* an unearthly beast has taken possession of your mind and controls your sleeping thoughts.



When you enter the *Dream Zone,* be prepared to step into your worst nightmare. This combination text/graphic adventure takes you beyond the conscious into the world that opens when your eyelids close—the reality of dreams—deadly dreams. In your dreams you will face challenges, threats and lethal opponents more chilling than you might experience during your waking hours. And be forewarned—unless you succeed in conquering the dreads in the *Dream Zone,* you will never awaken again.

Every software developer is constantly looking for a new twist which will offer their users a worthwhile challenge, and Baudville succeeds in doing just that with *Dream Zone.* The storyline imitates one of those simultaneously fascinating/terrorizing dilemmas faced so often by victims of the old *Twilight Zone* television program. Even though you know the premise of the game is neither possible nor logical, if you allow your mind to indulge in a little game of "what-if," you can enjoy solving the game's puzzle and your character's predicament.

In *Dream Zone* an unearthly beast has taken possession of your mind and controls your sleeping thoughts. To defeat the beast and recapture your subconscious, you must enter your dreams, explore a world of talking rats, magic, riddles, beasts, oriental palaces and castles in the clouds. If you fail, you will die in your dreams.

To maneuver the 100-plus locations created in the game, you must collect useful items, converse with the characters you encounter, buy, sell and use objects, and inspect every corner of the world created in your subconscious.

The game's first stage reminds me a little of *The Wizard of Oz* movie because it is played out in a world of black and white images. But after you explore your home and fall asleep, your dreams are displayed in full color, like Dorothy's land beyond Kansas. The black and white images are actually digitized photographs, while the color graphics are computer-generated drawings. You can click on any object in the image and the text area of the game will report its status.

I found the game's heavy use of graphics a real plus. Almost every turn in the story introduces a new view of the world beyond your bedroom. Some adventure purist might argue that the inclusion of graphics dulls the fun of exploring the inner creations of a game, but I am not one of them. Rather than using the graphics to simply illustrate the storyline, they are actually part of the game. If you click on an important object, information about it will be displayed in the game's text area. You can also pick up and use items displayed in the graphics by simply clicking on an icon verb and then clicking on the object. This sensible interface really speeds up the action in *Dream Zone,* since you don't have to waste a lot of time testing unimportant objects or typing (or mistyping) the same command over and over.

Dream Zone's interface is well designed and delightfully forgiving of input errors. If you are an old hand at text adventures, you can converse with the game using the traditional keyboard commands, but if you prefer you can interact with the game almost exclusively via the mouse. An area below the graphic display is reserved for text. If you want to issue a command you can type it, press RETURN, and the program will instantly respond.

I preferred the icon-sensitive interface which allows the user to click on an item, command word or directional area. For instance if you want to go east you can either type "East," "E" or click on the icon labeled "E." The most common commands like Use, Inspect, Buy, Get and Open, can all be selected by typing or clicking. And the inventory of items you collect during your journey is display and selected in the same manner. This sensible interface eliminates all of the command memorization and wasted time trying to guess legal input required by early text-only games. I'm not saying there is anything wrong with text-only games, only that many new users are put off by the apparent complexity of interacting with their parsers. *Dream Zone*'s interface removes those barriers. The inclusion of both a text- and icon-controlled command structure will be welcomed by new adventurers, while old hands can jump in and begin exploring using the text environment they prefer.

I both chuckle at and applaud the programmers' solution for responding to unsavory commands (and don't tell me you don't know the kind to which I'm referring) issued by the user. If you input any words or activities which would be censored on network television, the game responds by saying that your mother appeared out of nowhere and washed your mouth with soap. I appreciate programmers with a sense of both humor and decorum, and *Dream Zone* shows that its creators had both. Three pull-down menus complete the game's interface, making it one of the easiest to control adventure games I've yet tried.

I won't ruin your fun by telling you how the game ends or how to complete it, but I

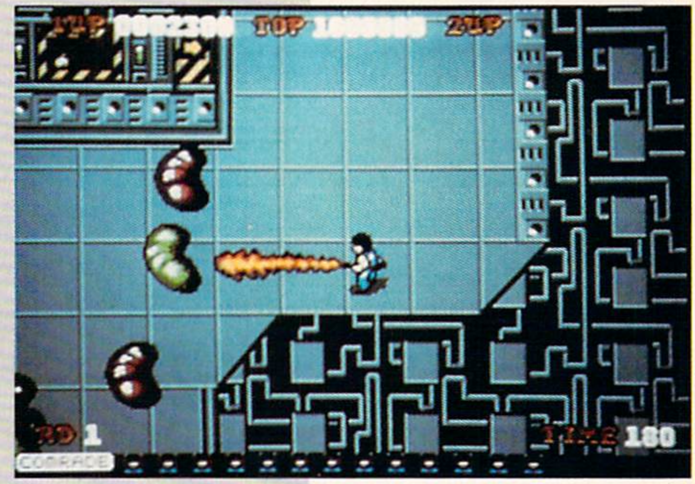
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Reviewed by Mike Rivers

Alien Syndrome

Computer: Amiga*
Publisher: Sega
Distributor: Mindscape, Inc.
3444 Dundee Road
Northbrook, IL 60062
(312) 480-7667
Price: $39.95

In *Alien Syndrome*, you are sent to a distant outcolony in space that has been overrun by a parasitic super-virus that feeds off human energy.



You can tell a good arcade game for a micro when you unconsciously reach for a quarter between plays. *Alien Syndrome* from Sega will have you doing that almost immediately, so be careful to keep the currency out of your disk drives. It figures, this company has been producing top-quality arcade games for years. *Alien Syndrome* is another in a long line of Sega arcade classics, and has been carefully crafted to have the "look and feel" of the soda-shop coin eaters that can't be left alone.

In *Alien Syndrome*, you are sent to a distant outcolony in space that has been overrun by a parasitic super-virus that feeds off human energy. A one- or two-player game, you can choose to be a male or female character. There is an options screen for one player, two players with joysticks, two players—one with a joystick, one using the keyboard and a "define keyboard" function.

Both characters are drawn in the manner of "Japanamation" cartoons which reinforces the arcade appearance of the game. At first, armed with only a rifle, you must roam the labyrinthine space station rescuing the crew members as you go. The station is represented as a pattern of passages, doors, ventilating shafts and rooms, in a standard 2D layout.

The crew members are strewn about the complex in various places and appear to be sticking out of the floor, each in a blob of alien glop. They are not in any immediate danger, and are all waving at you for rescue (the effect is rather comical). At every turn, you are set upon by the alien life-forms which resemble giant mutant jellybeans. The level one aliens emit smaller "spores," which if allowed to go to pieces in proximity to the player, will "kill" you. Whenever a player "dies" you hear a digitized scream.

The sound effects are nicely done and not at all annoying, unlike many arcade games that can drive you batty if you don't turn them off. Mostly you hear your own weapon and a suspenseful motif.

More advanced weapons are located behind panels throughout the ship. Weaponry includes Fireballs (very effective), Lasers (primo, blast through groups of aliens), Flame Throwers (surprisingly useful, but short range), Bomb Launcher (clunky, but it works; the instructions say this will help against "Super Aliens"), and Shots (standard rifle, slow, short range).

The instructions hint that some of the weapons are better suited to destroying aliens than others, for example, the laser has a long range and does more damage. With some practice, I think any of the weapons could be used to complete a round. This can add a new dimension of challenge after mastering a level with a particular weapon. Two players could compare scores using only the flamethrower. I recommend the laser, fireballs or the flame thrower.

While you blast jellybeans and rescue hostages, the seconds tick away as a time bomb counts down to detonation. To complete your mission you must rescue 16 crew members in 250 seconds per level before the time bomb goes off. You must determine a "best path" to take which allows you to optimize your rescue and kill counts versus time. On level one you should be able to rescue all the hostages and reach the exit with 80–90 seconds left on the clock.

The walls of the station contain not only weapons, but also maps showing the locations of remaining hostages, bonus point panels, and my favorite, what I call a "tail-gunner droid." When you touch a certain panel, you get a little robot that follows you around and shoots at aliens behind you. He takes some of the heat off while you search the ship, and he can help you get out of tight situations. Droids can get stuck in doors when going in and out of rooms, so you must give them a moment to follow you through. If your droid gets stuck, open the door again to let it out.

True to arcade form, the screen shows current and high scores, lives remaining, play level, hostages remaining and time remaining. An extra life is added every 10,000 points. The controls are simple; the joystick moves the player in eight directions, and the fire button fires your weapon. To activate maps, panels and rescue hostages, you simply touch them.

Getting between levels is tricky. Each transporter station is guarded by a Super Alien. The Super Alien spouts things that look like tadpoles, which like the Super Alien, are difficult to kill. If you manage to score enough hits in the right place, the Super Alien fragments into two pieces.

Continued on page 82

**64 and MS-DOS versions are also available.*

Reviewed by David Duberman

Sculpt–Animate 4D, Jr.

Computer: Amiga
Publisher: Byte-by-Byte
Arboretum Plaza II, Suite 150
9442 Capital of Texas Hwy. N.
Austin, TX 78759
(512) 343-4357
Price: $149.95

In 1987 Byte-by-Byte introduced the first Amiga 3D modeling and ray-tracing program, *Sculpt 3D*. Still available (version 2.0 will be released soon), *Sculpt* allows users to create stunning photo-like images by creating and setting wire-frame objects within a 3D space depicted in a three-window set-up called the Tri-View. After you assign surface properties to objects and position the lights and camera, the computer calculates the image and draws it pixel by pixel. Ray-tracing can realistically depict reflections and shadows, but the final rendering process may take many hours if top quality is desired.

Soon after *Sculpt 3D* came *Animate 3D*, which combined with *Sculpt* to add sophisticated animation capabilities. Late last year Byte-by-Byte released *Sculpt–Animate 4D* (suggested list $499.95), a "professional" version which added a number of object creation tools, a new surface property (metal) and subtle enhancements such as improved file requesters.

Sculpt–Animate 4D, Jr. is a scaled-down version of *Sculpt–Animate 4D*. It's intended as an introductory product for the amateur 3D artist and animator, and as such provides extremely good value. It doesn't ray-trace and it doesn't do path animation. However, it does offer the exact same user interface, data file formats and many of the features of the more expensive versions. If you have a previous version of *Sculpt* or *Sculpt–Animate*, you don't need *Jr.* But if you buy any Byte-by-Byte product, the publisher offers a reasonable upgrade path to more powerful versions. Since *Jr.* is a subset of *Sculpt–Animate 4D*, most descriptions here apply to the high-end product as well.

Advantages

Jr.'s principal advantages include a versatile user-friendly wire-frame object editor as well as a powerful form of animation known as "tweening." The program is compact enough to be used in a 512K Amiga, although you're better off with at least one megabyte of memory. *Jr.* does contain one of *4D*'s enhancements—the ability to load and unload the Workbench and part of the program code to accommodate limited-memory situations.

> It's intended as an introductory product for the amateur 3D artist and animator, and as such provides extremely good value.

One of the program's best advantages for beginners is the manual. The author, Cathryn Graham, wife of *Sculpt*'s programmer Dr. Eric Graham, has honed her technique since the first somewhat awkward *Sculpt 3D* manual and has produced an admirable work with this edition. Loaded with well-explained tutorial material as well as an ample reference section, not to mention a table of contents and an index, its only flaw is that it's perfect-bound (square-edged) and thus difficult to lay flat next to the computer.

But you'd better keep the manual handy, because the first thing you'll have to do when running the program is type in a word from it. Another innovation inherited from *4D*, this new (for Byte-by-Byte) protection scheme is annoying, but is superior to copy-protecting the disk.

Using the Program

Jr.'s main work area is the same Tri-View used in all of its predecessors. Apparently Dr. Graham feels he got it right the first time, an opinion with which I concur. It's not perfect, but it makes good use of the available (Amiga operating system) tools. The Tri-View consists of three movable, resizable windows showing the 3D work area from the top (or bottom), front (or back), and right (or left) side, respectively. When you resize a window, the program adjusts the others so that the same section of the 3D space is shown in all. A couple of handy menu commands let you tile the windows in either a small, non-overlapping or a large overlapping configuration.

Objects in *Sculpt* are composed of connected triangular faces, each of which contains three points or vertices connected by lines or edges. You can create vertices anywhere in the 3D space by setting the position in any two windows, then clicking both mouse buttons.

You specify objects for moving, resizing, etc. by first selecting the vertices that define them, and *Jr.* gives you a number of ways to do so. The most direct way to select a vertex is by double-clicking on it—it turns yellow—or use the same action to deselect it, whereupon it returns to its former purple tint. A handy menu command is Select Swap, which selects all non-selected vertices and deselects all selected ones. You can select an entire object by simply positioning the cursor on any of its vertices, then using the menu command Select Connected. Other methods are mentioned below.

Arrayed around the edges of each window is a set of tools which provides handy access to common operations. The Edge tool lets you create faces and edges by connecting selected vertices. Other tools let you zoom the window in and out as well as move the window sideways in the 3D work space. The Selector gadget lets you select or deselect only vertices currently shown in the currently active window. The Grabber lets you reposition selected vertices, and the Rotate gadgets provide interactive 3D rotation capability, an invaluable tool. Alas, there is no Undo command, although the Grabber has a limited undo effect built in.

The program starts to redraw the display each time you issue a command, and when you're working with complex objects, redrawing three windows can take many long seconds. Fortunately, you can still issue new commands during the redraw which take effect immediately. So if you want to zoom in three times, you needn't wait for three redraws. This considerate feature can save enormous amounts of time.

Jr.'s object editor includes all of the built-in basic shapes of its predecessors—sphere, hemisphere, cone, cylinder and the like. Also present is the curve tool that lets you draw a continuous line connected by vertices. The spin and extrude commands work like *Sculpt–Animate 4D*'s. With spin, you first draw an outline with the curve tool, then spin it about a central axis, much like using a lathe. You can specify any number of sections, using more for a smoother outline but a greater memory and time consumption. You can

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Reviewed by Russ Ceccola

Street Cat

Computer: Amiga
Publisher: Epyx
600 Galveston Drive
Redwood City, CA 94063
(415) 366-0606
Price: $24.95

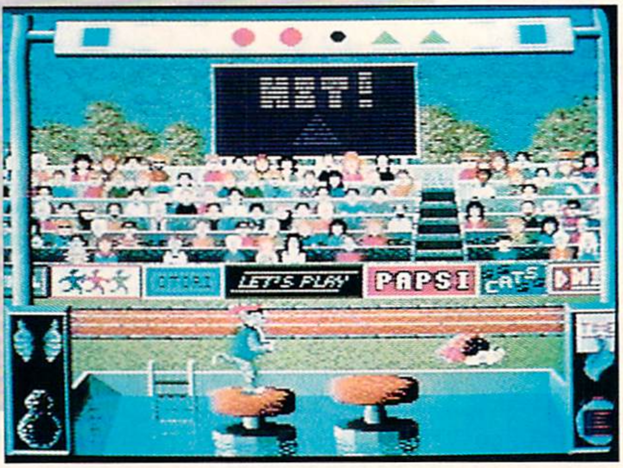
Epyx is famous for games that really test the durability of your joysticks. Heck, they even market their own joystick (the best one I've seen yet) to let people play games with a single stick longer. From *Summer Games* to *Final Assault,* Epyx games rely heavily on moving the joystick back and forth repeatedly in certain directions to enact a move on the screen. Some argue that these games are mindless, but others claim they take skill.

In *Street Cat,* a new game from U.S. Gold, released in the U.S. through Epyx, there is a little of both types of movement, with the emphasis put on the latter—skill. I played *Street Cat* repeatedly until I could make it through each segment of the game. Then I stopped and played again.

Street Cat isn't your typical multi-event arcade game. Because the game was designed by U.S. Gold, you know that the arcade aspect of *Street Cat* will heavily outweigh any other elements. The character you move around the screen is a real hip-looking cat with a bandana, sunglasses and a denim jacket—the Bruce Springsteen of the feline set. You have to move your cat through four events plus an interlude screen. Each of the events is fun and they combine to tell a complete story, with your goal to be the baddest cat in town. That's not too hard, is it?

Actually, it is a bit hard in different parts of the game. There are a couple of stumbling blocks. But, after you figure out how to get through them once, you won't have a problem next time. Except for these couple of difficult spots, *Street Cat* plays very well.

You have to get your cat through what are essentially obstacle courses in the first and third events. The second and fourth events take place on a single screen. This balance, along with the interlude screen between all events, keeps *Street Cat* moving along at a good pace. A typical game takes about a half hour, but that half hour will be full of action and excitement. Now let's talk about those cool events.



Street Cat starts out with "The City Park" event. Along the bottom of the screen, you see a side view of the entire length of the event. This "radar" view, as I like to call it, shows how far you have gotten along the path by placing an arrow that points to your present location in the park. The arrow scrolls through the miniature view as you move along through the overhead view. This was a nice touch for the event and helped me to figure out how far along I got in the park. There are eight screens in the park, and each offers a different challenge.

The obstacles in order are the water jumps, garden walls, circus ball, train trestle, trampoline, jungle gym, swing and motorcycle. By jumping, crawling and somersaulting, you make your way from obstacle to obstacle. Each one is about the same difficulty. Once you make it past an obstacle, you'll be able to duplicate your work the next time through.

I found the hardest to be the jungle gym. To get past it, you have to jump in the air to grab the first crossbar. Simultaneously, you have to begin to quickly move the joystick left and right so that the cat stays on the bars. If he falls off the bars—meaning that you let go of the joystick for a fraction of a second—the cat falls and you have to start all over again. I found this obstacle and others like it in the game (quick left and right movement without the option to stop and rest) unpleasant and downright difficult. I think that if you let go of the joystick, you should be able to keep your cat at the same place on the jungle gym.

The next screen is the interlude screen between events. In it, you see an overhead view of the city. A dot represents your cat, and moving objects represent police cars. They move along the streets randomly. If you touch them, you are stuck in that position for a few seconds. This just helps to wind down the clock that is running all the time. I forgot to mention that in each event a clock is counting down. If the clock runs out before you finish the event, you don't get any normal points for that event—only the bonus points you've picked up.

In order to clear the interlude screen and make it to the next event, you must move your "street dot" along the streets to the flashing red dot. Press the joystick button when you get there and you're on your way to the next event. Along the way, you may run into flashing disks. If you touch these, you will get bonus points. In fact, don't go right to the flashing red dot. Try to get as many disks as possible before the timer gets too low. You also have to choose a path wisely, because certain roads are blocked by bulldozers. The locations of the bulldozers on each interlude screen throughout a game of *Street Cat* are chosen randomly.

The second event is "The Swimming Pool." This is the toughest event, and it takes a lot of practice to get the move down. You have to catch specific geometric shapes on a moving strip above a swimming pool. You do this by jumping high in the air and catching the shape as you reach the top of the screen in mid-jump. Since you're a cat, you hate the water and would rather not fall into the pool. To keep you from doing this, there are two platforms floating in the water. As you jump

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Reviewed by Steve King

Advanced MIDI Amiga Sampler

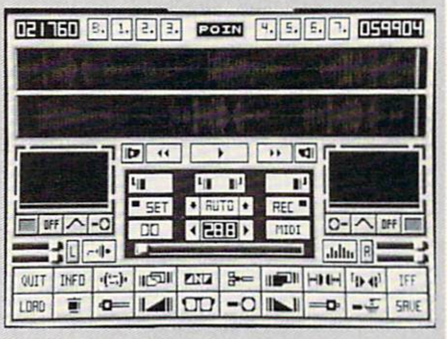
Computer:	Amiga
Manufacturer:	Michtron 576 S. Telegraph Pontiac, MI 48053 (313) 334-5700
Price:	$169.95

A.M.A.S., short for Advanced MIDI Amiga Sampler, is an audio system for the Amiga computer comprised of both hardware and software. The hardware is a small, wedge-shaped box with two cables which attach to the parallel and serial ports on the back of the computer. This hardware contains both an audio digitizer and a standard MIDI interface. The digitizer has two inputs: one utilizing phono jacks for low signal sources (such as the headphone jack of a portable tape deck or CD player) and the other a subminiature phone plug for a high impedance microphone.

There are also three MIDI connectors (in, out and thru). The accompanying software serves double duty, as it controls the digitizing process and also allows you to play sound samples through the Amiga using the keyboard of any MIDI-capable synthesizer.

The heart of the program is the Main Editor Screen—a graphically slick control panel with buttons, switches, readouts and sliders galore. In fact, the software is entirely mouse-driven, and the keyboard is used only to enter filenames, play music and select banks of samples. The topmost section displays the banked memory selectors as well as your edit marker positions. Depending on the amount of memory you have available, the program can handle up to eight banks of sounds, each containing up to ten stereo samples. A standard 512K machine can only accommodate one bank while a 1 MB computer can handle three. Unfortunately, the maximum length of an individual sample is about 78K.

Below the banked memory selectors lie two long rectangular boxes, one for each stereo input channel. These windows display the samples stored in the currently selected bank in graph form. Each window has two vertical lines which you move with the mouse. Most editing functions operate only on that portion of the sound sample that falls between the markers.



The heart of the program is the Main Editor Screen—a graphically slick control panel with buttons, switches, readouts and sliders galore.

Below, and to the left and right, are two oscilloscopes which display incoming sound signals in real time. A flashing green light indicates the proper volume level and will turn yellow if the volume is too loud. A click on the Waveform button will freeze the scope. Below the scopes sit four slider volume controls and a loop button for each channel. There is also a Spectrum Analyzer button which when clicked brings up a real-time moving bar graph display showing the frequency content of the incoming signal.

The center of the screen contains the Main Control Panel. Here you can select, among other things, the recording mode (mono or stereo), the recording frequency (up to 28khz), and the auto record function (which starts the digitizing process when the input exceeds a user-specified level). Another switch toggles the internal Amiga low-pass filter which produces a crisper sound at higher sampling frequencies.

At the bottom of the screen are two rows of buttons which essentially control the editing functions. Here you can swap two samples, or mix them together, as well as reverse, copy and cut them. You also have the ability to shrink a sample (which reduces both its size and quality) or take a mono sample and pan it across two channels to create the effect of a sound moving from one speaker to the other. You can also fade in, fade out and filter samples or any portion of them. To aid the editing process, you can magnify any part of the sample. A.M.A.S. will load and save samples in standard IFF or raw binary format.

Since the maximum length of any filename is 12 letters, the name of any sample you want to edit which happens to have a longer filename will not load unless you manually change the name.

When you click on the MIDI button on the Main Control Panel, the bottom rows of buttons are replaced with a new set of controls, and the MIDI capabilities of A.M.A.S. are activated. Up to ten samples can be loaded, and each is assigned to one of the function keys. These samples can be played by pressing the appropriate function key itself, by using the Amiga keyboard or playing the notes on a MIDI-capable synthesizer connected to the hardware module. In the latter two cases, the frequency of the sound will be shifted (a single sound will be played over a range of notes) depending on which key you press. Thus, a sampled sound of a barking dog can be turned into musical notes. Up to four mono or two stereo samples can be played simultaneously. One nice feature allows you to split your synthesizer keyboard into sections and assign the keys in each section to a different sample.

A.M.A.S. produces excellent quality samples and, unlike other audio digitizers, comes with a built in MIDI interface. The software is easy to use and all the usual and necessary features are present. The manual is short but adequate. Undoubtedly, the nicest part of the system is the graphic user interface. The main drawback is that the hardware takes its power from the serial port, so that cable must always be connected—even if you don't want or need the MIDI capabilities.

Moreover, users with no need for MIDI are probably investing in peripheral power they don't really need. While this package is neither unique nor earth-shattering, it does do the basic job well and is worth considering as a purchase for your computer audio needs. ■

by Russ Ceccola

Role-Play Chronicles:

New Medium or Just Another Text Game?

This month we've got some exciting new programs to talk about. However, with the exception of *Last Ninja 2, Action Fighter* and *Thunder Blade,* they are all available only for the Amiga. I didn't do this on purpose—it just seemed that the best stuff this month was only for the Amiga.

I'm rushing around trying to get things done because I'm about to leave for the Consumer Electronics Show in Chicago—I'll mention any interesting notes next month. There is one thing that I noticed that I wanted to mention, however. *Sky Shark* was just released for the Commodore 64 from Taito. This game has got to be one of the best 64 arcade translations around. It's got the graphics, sounds and game play all down pat. It's a prime example of what an arcade translation is supposed to be like. Hats off to Taito for this success!

So, until next time, if you've got any suggestions, complaints, news, praise or Garbage Pail Kids stickers from series 1 through series 8, send them along to:

Russ Ceccola
c/o *Commodore Magazine*
1200 Wilson Drive
West Chester, PA 19380

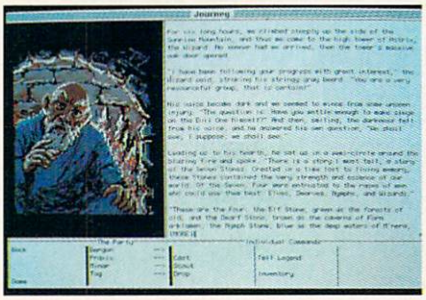
Journey ★★★★½

Infocom/Mediagenic
3885 Bohannon Dr.
Menlo Park, CA 94025
(415) 329-0500
Amiga: $49.95

From the title of this column, you can see that there might be some doubt about *Journey,* Infocom's first game in a new category called "Role-Play Chronicles." Leave it to Infocom and pioneer Marc Blank to come up with such a system. In Role-Play Chronicles, the text of your adventure and all your actions are told in the form of a diary being kept by one of the characters in your party. This means that the text fits together to form a real story, unlike attempts in the past.

And in this text game there is no typing involved. All options are selected from command menus at the bottom of the screen. You simply click on the character you'd like to control, and a list of possible options comes up. This list changes with every move. It offers only logical options that the character can do at that time. This system eliminates doing a lot of things that have no bearing on the story. Every action and menu selection moves the story along.

You play *Journey* to a logical ending, as well. Even if you don't get to the real goal of the game, you do reach an ending. The result is that you can play *Journey* for hours on end because there is no "wrong" move.



Along with the text, there are over 100 pictures in the game to brighten the screen. They pop up more often than in a standard illustrated text adventure. In *Journey,* you are guiding the party that consists of Tag, Praxix, Bergon, Esher and Minar, as they attempt to investigate the blight that has touched their town for five long years. Hints are included on the disk in the form of musings, looking back upon previous moves in story form. Ultimately, Infocom has done a great job with this new format and I look forward to many more to come.

Thunder Blade ★★★

Sega/Mindscape, Inc.
3444 Dundee Road
Northbrook, IL 60062
(312) 480-7667
Commodore 64: $34.95/Amiga: $39.95

I really have mixed feelings about this game. The original arcade game had one of the most awkward controls that I have ever seen. It had a long handle that you used to move your helicopter all over the place. The 3D graphics were great, but it just didn't feel right. You know what I mean? The same is true with the Amiga version of *Thunder Blade.* You just die too quickly because it is difficult to get a handle on how to control the helicopter that



you move around the screen. It's sad when the 64 version of a game is better than its Amiga translation.

In *Thunder Blade,* you are flying a combat chopper on a dangerous mission: you must blast the enemy to smithereens and eventually destroy the enemy headquarters in the middle of the ocean. The game switches from overhead views to 3D coming-at-ya views to move the game along. It's tough to get used to the views from your chopper; but once you do, you'll be able to pick up on the game rather quickly. I have one major complaint with *Thunder Blade*—in both versions of the game the chopper moves too slowly. For this reason, you can't move out of the way of oncoming fighter planes or tanks and you die. This should be changed in future versions.

Action Fighter ★★★★

Sega/Mindscape
Commodore 64: $24.95/Amiga: $39.95



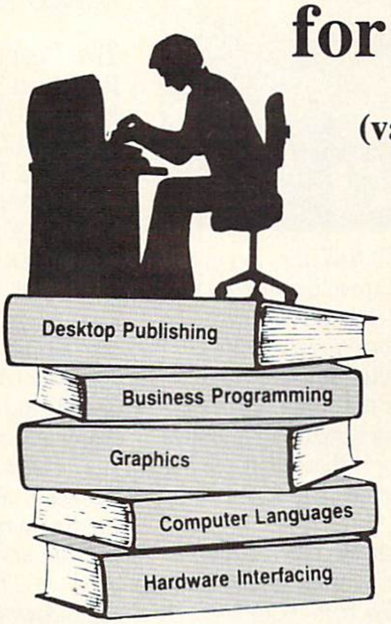
Remember *Spy Hunter* in the arcade? That was probably the biggest influence for *Action Fighter.* Although I've never seen this game in the arcade, it is supposedly in Sega's Arcade Hits series (of which *Thunder Blade* is another example). In any case, *Action Fighter* is great. Unlike *Thunder Blade,* its Amiga version is better than the 64 version.

In *Action Fighter,* you must guide a mo-

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Continued from page 28

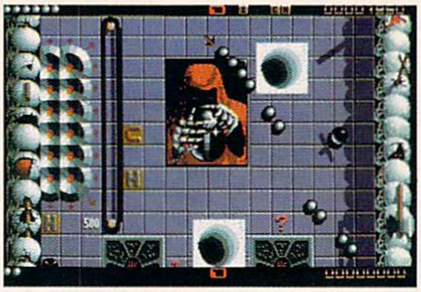
torbike down roads and jump over water with ramps, all the time shooting away at the bad guys. Every now and then, a truck bearing the Sega logo pulls in front of you. If you drive into the van, it gives you extra powers and some parts for what you can later change into an airborne jet.

Once you change into a jet by collecting all the right parts, you take off into the sky and blast away spaceships and helicopters instead. Whether on the ground or up in the air, *Action Fighter* is very easy to play, but real hard to master. The game requires no thinking, so you can just go on blasting away and collecting parts, without thinking about some ultimate goal. This is true to the name of the game.

Ballistix ★★★½

Psyclapse/Psygnosis Ltd.
c/o Computer Software Services
2150 Executive Dr.
Addison, IL 60101
(312) 620-4444
Amiga: $34.95

Ballistix is one of those games that has the mark of European craftsmanship all over it. It is a one- or two-player game that is reminiscent of soccer, pong and air



hockey all in one. In *Ballistix,* you must fire balls at a puck traveling around the screen. The puck is released in the center of the board, and the two opponents (a friend or the computer) must try to fire these balls in order to bounce the puck into the other player's goal. What makes *Ballistix* interesting is that the game has a lot of playfield elements that pop up to ruin your plans.

Things like acid pools, pipes, hyperspace tunnels, shields, troughs and magnets make your work more than just a little hard. Another thing that makes the game worth the effort is that you can change a lot of options to tailor the game to your personal skills. Such game elements as ball speed, number of balls, ball life span and others can be used to make *Ballistix* a fair challenge for all playing. I really enjoyed *Ballistix* and hope that there will be more just like it to come from Psyclapse/Psygnosis.

The Last Inca ★★★★

Free Spirit Software
P.O. Box 128
58 Noble Street
Kutztown, PA 19530
(215) 683-5609
Amiga: $39.95

True text adventure games are a thing of the past. So we die-hards must be satisfied with games that use the text adventure format, but add pictures to the text to spice things up. Now that even Infocom does it, you probably won't even find many all-text games anymore.

The Last Inca uses the full power of the Amiga to offer a game that is most like the Rainbird adventures. It is challenging, fun and keeps you guessing. It looks good too. *The Last Inca* lets you pull down the pictures into full view or drag the text over them. This, plus the menus that you can access, bring to mind those Rainbird adventures.

What separates *The Last Inca* from others is the story. An evil wizard named Zulphosi has long been held under the rule of three wizards from the Galapogos Islands.

Now that the last one has died, Zulphosi escapes and seeks revenge against the Incas for their allegiance to those three wizards. In order to do this, he needs the Crown of Power. You, of course, must beat him to the Crown. *The Last Inca* takes the best elements of adventuring through ancient temples á la Indiana Jones and puts it into text adventure format. Die-hard adventurers should love this one.

Jug ★★★★

Microdeal, Ltd.
576 S. Telegraph
Pontiac, MI 48053
(313) 334-8729
Amiga: $39.95

Jug is one of those really strange-looking Amiga arcade games that turns out to be really cool. The title of the game is your character in this classic arcade piece. Your character looks like something from the movie *Aliens* as it flies around the screen. You are a titanium humanoid in the distant future whose job it is to make sure that the virus that is destroying the planet Spireaus is eliminated.

It's not as easy as it might seem because the defense systems on the planet are mistaking you for a deadly tumor yourself. Your efforts revolve around getting as much energy as you can and picking up new weapons every now and then as the old ones run out.

You fly around in *Jug* looking for the virus. It will be easy to tell when you find it. There are four zones on the planet. Each is further subdivided into four sectors. There are trap doors that you can use to move up and down levels.

Jug is fast and furious, and it will take some doing before you can think about finding and destroying the virus. I think that Microdeal could have thought of a better name than *Jug* for the game; but it's fun and challenging anyway, so who cares?

Last Ninja 2 ★★★★½

Activision
3885 Bohannon Drive
Menlo Park, CA 94025
(415) 329-0500
Commodore 64: $34.95

Last Ninja 2 picks up where the original left off and really gives the action adventurer something to sink his teeth into. In *Last Ninja 2*, you are transported to New York City where you try to get rid of the henchmen of Samurai Master Armakuni and, ultimately, the Samurai Master himself. True to the nature of the original, you see things from a forced side 3D perspective á la *Zaxxon*. Use your trusty sword to beat off all the ninjas sent to distract and kill you. Your game is timed, so don't take too long.

Last Ninja 2 is divided into seven levels: Central Park, The Street, The Sewers, The Mansion, The Highrise, The Basement and the Inner Sanctum. How come all these bad guys hide in the Inner Sanctum?

In *Last Ninja 2*, Activision did a good job of making sure that everything matches up in the 3D perspective. The extra work they did on this 3D action really pays off as you try to do some of the more difficult moves and collect some of the objects. You can tell the original game and *Last Ninja 2* apart easily. *Last Ninja 2* gives you more neat graphic environments to explore and a lot more things to do to finish the game. It's a very good example of what action adventures are supposed to be like. ■

★	= poor
★★	= fair
★★★	= good
★★★★	= very good
★★★★★	= excellent

by John Iovine

Building a MIDI Interface Device

for the Amiga

The Amiga computers have an RS232 serial interface capable of supporting a 31.25K baud speed rate. This is the baud rate required for MIDI. Many companies have capitalized on this and sell MIDI software and hardware for the Amiga computers. Low-end MIDI hardware interfaces cost about $60, but you can build your own MIDI interface for less than half of that.

The interface is compatible with all MIDI software for the Amiga 500 and 2000 computers, and you will need software to run the interface. If you don't want to invest in a commercial music/MIDI software package such as Aegis' *Sonix,* you can find inexpensive MIDI software in the public domain (on Fred Fish disks, for example).

For a complete description of MIDI signalling and processing see the article on building a MIDI interface for Commodore 128 and 64 computers (*Commodore Magazine,* March 1989).

Operation

The Amiga RS232 serial port is at the back of the computer. We connect our circuit to it using a DB25 female connector. The serial port on the Amiga operates at +/– 12 volts. A signal voltage between +5 and +12 volts is interpreted as a logic 0. A signal voltage between –5 and –12 volts is seen as a logic 1.

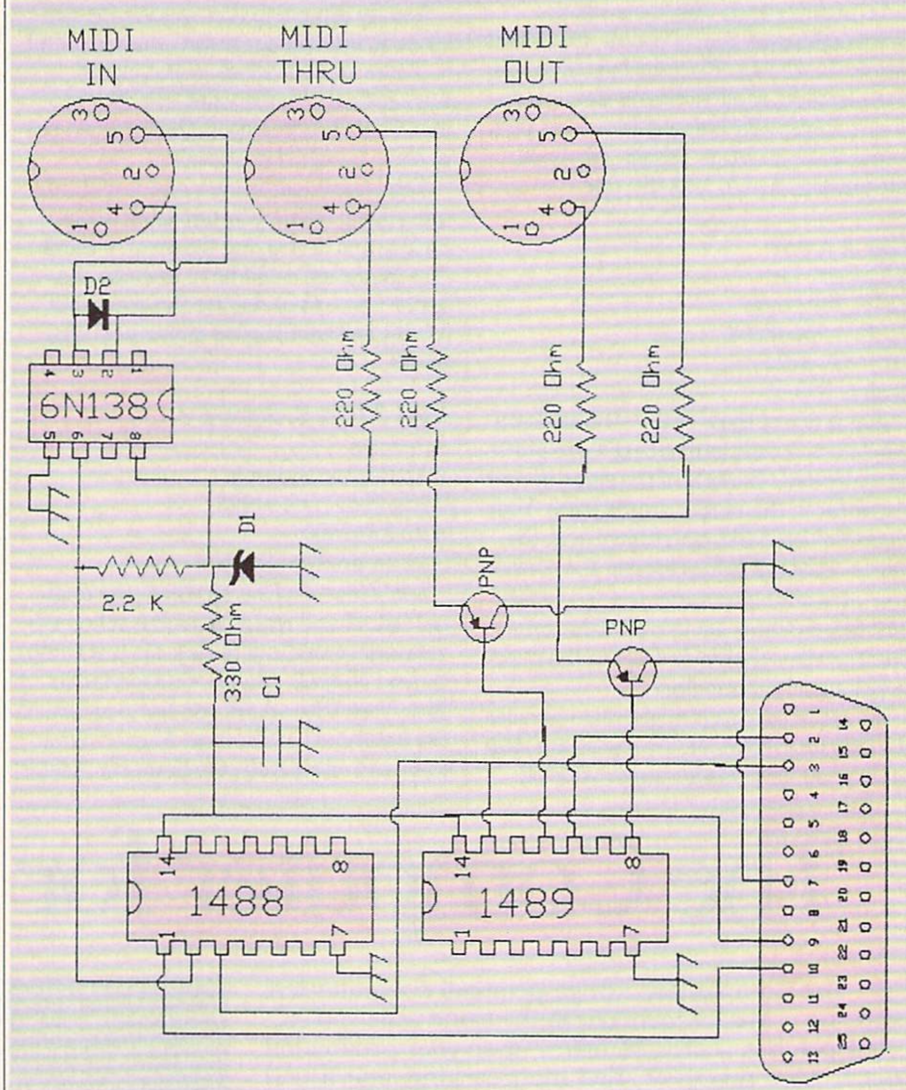
MIDI IN

The RS232 (+/–12V) voltages are out of the range for the MIDI device. But we have at our disposal an MC1488 Quad Line Driver IC that converts our TTL voltage logic from the 6N138 optoisolator to RS232 voltage logic. The RS232 logic signal is then presented to the Amiga's serial port, pin 3 line (Receive Data RxD).

MIDI OUT

The MC1489 Quad Line Receiver IC converts the RS232 signal transmitted from pin 2 line (Transmit data TxD) to TTL Logic.

RS232 Serial Port Amiga 500/2000



MIDI THRU

If you have a sharp eye you may have noticed that we pulled an additional signal from the MC1488 line that's connected to pin 3 on the serial port, to drive another gate on the MC1489. This gate becomes the MIDI THRU. It faithfully retransmits any MIDI data present on the MIDI IN port.

The PNP transistors on the MIDI OUT and THRU provide the appropriate current loop signals required by MIDI.

The construction is straightforward. One thing to notice on the schematic, however, is that the 6N138 opto-coupler is upside-down. Also, this is the only part that cannot be purchased at Radio Shack. Although the 6N138 is recommended as the component of choice, you may want to try changing this IC to an optoisolator available from Radio Shack.

Parts List

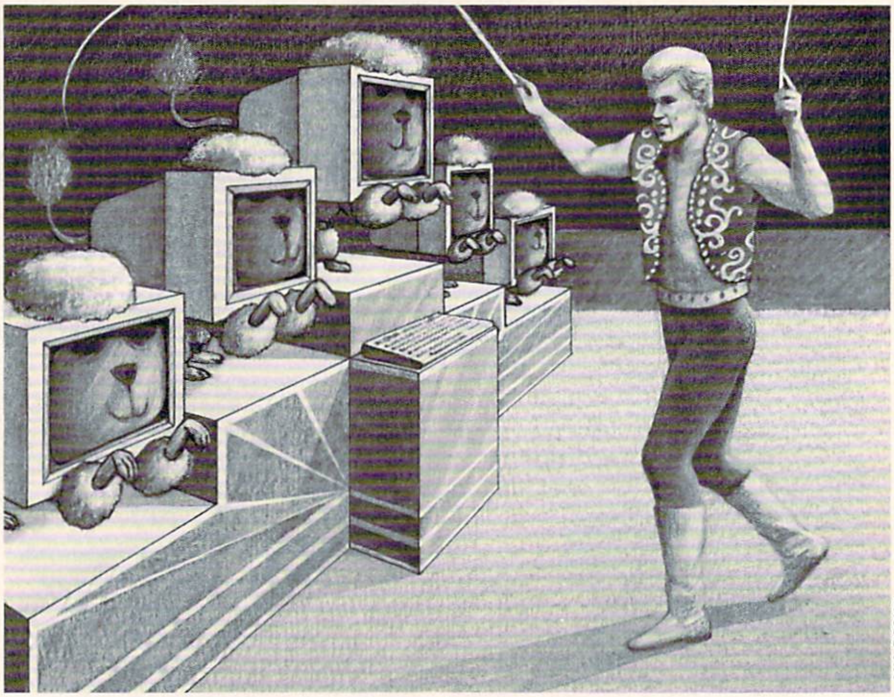
Qty	Item	
1	6N138 Optoisolator	PN# 6N138GI Digi-Key
1	MC1488 Driver	RS# 276-2520
1	MC1489 Receiver	RS# 276-2521
1	DB25 Female	
3	5-pin DIN Socket	RS# 274 005B
2	PNP transistor	RS# 276 1604
4	220 ohm resistor	
1	2.2 K ohm resistor	
1	330 ohm resistor	
1	D1 6.1V Zener diode	RS# 276-561
1	D2 Diode	RS# 276-1620
1	C1 1uf 16 volt capacitor	

RS = Radio Shack

Digi-Key
701 Brooks Avenue South
P.O. Box 677
Thief River Falls, MN 56701-0677
(800) 344-4539

by Jeff Spira

Artificial Intelligence and Artificial Life



MIA BOSNA

Number 5, HAL, Landru, Colosseus, Mr. Data and many other lifelike computers of science fiction lore have been gracing the themes of sci-fi writers for decades. Practically since the first vacuum tube Eniac computers, the doomsayers have been preaching that some day the computers will take over the world from us humans and run things with an iron hand (or is it a silicone hand?). When the first experiments into artificial intelligence were publicized, those same doomsayers were all shouting, "I told you so!"

Just as computers have become as nonthreatening as electric can openers, and we find out that there aren't any supercomputers running for congress or pulling off coups in Latin American republics, it's time to take a good hard look at AI and see just where it is going.

While artificial intelligence is becoming a reality, the actual fear of many of computers running amok and turning on man in a maniacal effort to take over is not now, nor will it ever become a reality. To call this fear artificial intelligence is a misnomer. What the computer-phobes are actually referring to is "artificial consciousness." Number five is *not* alive, nor will he ever be. Artificial consciousness *is* fiction and will remain so unless some mighty strange things happen to disprove modern science.

What artificial intelligence is has become two discrete topics: expert systems and learning systems. It is interesting to note that these two topics of AI encompass two very similar topics of human thinking. Learning is after all, simply appending a database, and so-called expert thinking is simply accessing that database correctly.

Expert Systems

Expert systems, the first type of AI, are fancy database access programs. The expert systems are set up to access a cross indexed database by using a set of rules that an expert in that subject might use for his own thinking process. This is best illustrated by example.

> There will always be an element of human behavior missing, though: the ability to take a risk, make a dice roll against staggering odds, or take a chance.

The 1988 Small Business Innovative Research program for the Department of Defense listed quite a number of expert systems that the DOD would like to have developed. One was for recognizing underwater sounds. Currently, submarines carry a person well trained in sounds. He spends hundreds and hundreds of hours listening to recorded sounds of every conceivable type of ship, boat, submarine, torpedo and marine life to instantly be able to distinguish each underwater. Submarine sonarmen become so good that they can tell the difference between each submarine they hear. They can tell you the name of a Russian sub that they hear from miles away.

Obviously, these sonarmen are vital to the survival of the submarine in a battle situation. If he were to bump his head and be knocked out during battle, the sub would be practically blind (actually deaf). An expert system that could listen to the sounds in the water, rapidly run through an incredible number of records, pick out a sound most similar, and report its findings, is the desired end product.

If you think about the number of possible combinations of sounds, it's an astounding bit of work. For instance, a sonarman can distinguish between two different ships running next to each other and not confuse the two sounds. This comes from experience. The sonarman actually learned the difference from hearing the sounds and unconsciously setting up a rule in his mind for distinguishing between two ships with one propeller each and one ship with two propellers.

To set up this expert system, the first step would be to put the characteristics of every possible combination of sounds into the computer in a huge database. Then you'd have to sit the expert sonarman down, get him to listen to the sounds and get him to describe his unconscious rule that he uses to distinguish each. Each of these rules would be used in the expert system to reduce the data about an unknown sound and come up with the right answer. It is a very tedious and complex problem. Whereas the human comes up with shortcuts, the computer often has to scan the entire database to come up with a match for every rule, then make an educated guess based on a "best fit" of data.

Obviously, many problems arise with trying to set up such an expert system. For one, not all experts agree on exactly how they arrive at their unique conclusions. Different "experts" actually arrive at different conclusions. Ask two expert programmers to solve the same problem,

compare the two sets of code, and you may be surprised to find that the two are more different than they are alike even though they may arrive at the same answer. The problem, then, is whose set of rules is more effective or more efficient.

Computers are, however, very fast in their evaluations, so it may be easily possible to fit many expert rule sets into one overall evaluation system, that is, take a consensus of all of the expert opinions and through some sort of democratic evaluation, arrive at a best fit answer.

Learning Systems

The other type of AI being studied these days is what are called "learning systems." Learning systems actually append their own databases much in the same way a human learns. The computer actually tracks experiential successes and failures, records the successes and throws away the failures. If only humans were so smart. The only thing actually learned from making a mistake is how to make a mistake, so the actual error, or failure situation is only recorded as a mistake.

The Future of AI

So much for the current theory and practice of AI, let's delve into where it might lead. With memory volume going through the roof and processor speeds accelerating to stratospheric speeds, modern computers have the equivalent mental capacity and processing speed of a mouse. That's pretty incredible when you stop to think that they had less brain power than a cockroach just five or ten years ago. Within another ten or fifteen years they ought to approach the mental power of a chimpanzee, and another ten years or so after that equivalent brain power of a man!

Will these machines be able to think? No. They will only run programs and will no more think than your Commodore 64 can. They will have some amazing features, though if AI research and development continues at its current pace.

You will, for instance, be able to have a small, laptop-sized computer, that will be able to eavesdrop on every conversation you've ever had. It will be able to go to school with you, record and append its database of chemistry information when you listen to a chem lecture, for instance. If at that time *Commodore Magazine* is offered on optical disk, or whatever data storage medium is in vogue at that time, it will be able to store, cross index and playback every word, article, ad, and even the addresses and phone numbers of the advertisers.

In short, this very personal computer will record, remember and be able to recall every event in your life, every football score, every girl's telephone number, even every dirty joke. You can see that many people will become very attached to and dependent on their personal computers. You could query the database like a super updated encyclopedia. It could play music, wake you up in the morning, keep track of your car mileage, remember friend's addresses, correlate the newspaper and present you with a full synopsis of the events in the Middle East, the stock market results, temperature in Zimbabwe, literally anything you ever learned in your life plus everything you've forgotten, plus every event in every electronic newspaper you've ever fed into it, plus every book you've downloaded.

> In short, this very personal computer will record, remember and be able to recall every event in your life, every football score, every girl's telephone number, even every dirty joke.

Everyone could carry around a small computer with as much information as is contained in a fairly large library. With the proper AI program, it could make evaluative decisions, give advice and access so much information in such a short time, it would make human thought almost redundant.

There will always be an element of human behavior missing, though: the ability to take a risk, make a dice roll against staggering odds, or take a chance. Another missing component of humanlike behavior will be a complete lack of creativity. It will make all evaluations based on probability and previously input data. It will never look at things with a new slant, synthesize new concepts, nor be conscious of its existence.

This will be truly an amazing device, even without its shortcomings. If you think that much of the world has the motivation of a brussels sprout now, just imagine if those people never had to remember *anything*. Now we have couch potatoes, then we'll have couch blankets. They won't even have to push the button on the remote control, the computer will remember their favorite shows, or evaluate the type of movies they prefer and decide which will be the favorite for tonight and automatically switch channels.

For many people, though, it will enable the rote work of remembering events and seeking out data to be performed for them, freeing their minds to actually perform creative thought without the excess baggage of mundane thought. The well-informed people will become super informed with a huge cross-referenced database of knowledge available for the asking.

The bugaboo in a system such as this is false data. The news media is quick to print or broadcast stories based on the best available information at the moment, but that data always changes fast as new information arrives. You'd likely get a few short circuits in your portable supercomputer if you asked it to correlate and make some evaluations about the Watergate incident, for instance, based on the contemporary news reports. I guess the whole topic of Richard Nixon will have to be left out of future computers. False data abounds from all sorts of sources.

What if some database and AI correlation software were based on the concept that if you go outside without shoes, you'll catch a cold? Or what about, "If you don't get good grades in school, you'll end up digging ditches"? Or one of my favorites—"This war is being fought to ensure the peace of the world"?

Old wives' tales aren't the only source of false data, either. Many usually very reliable sources have printed or expounded on quite a number of supposed "facts" that ended up to be pure conjecture and disprovable. Throw a few of these zingers into the early stages of the development of an AI expert system coupled with a learning system and you'll have computers exhibiting a very human behavior—schizophrenia.

Nonetheless, I welcome the day of miniature supercomputers with multi gigabytes of RAM, warp speed processors, and Library-of-Congress-sized storage devices. If nothing else, it will make the research of writers far more convenient.

Artificial Life

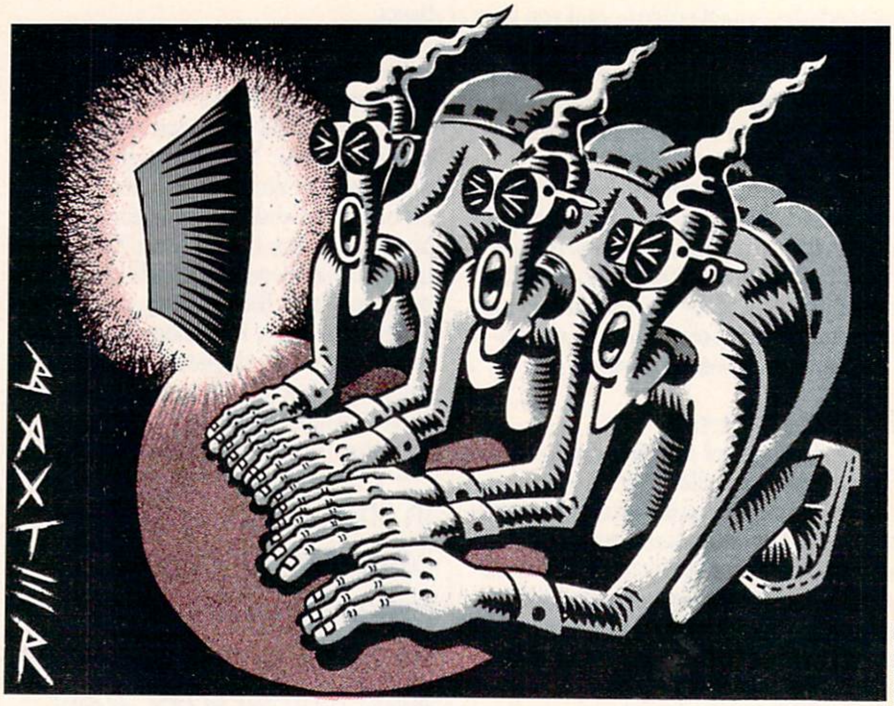
The seeds of artificial intelligence have sprouted an entirely new topic that is getting a considerable amount of research by some of the more esoteric programmers: Artificial Life. A-Life is today in its infancy and new and strange methods and techniques of programming are now being generated. The first A-Life conference was

Continued on page 66

by Mark Jordan

Laser Printing

Berkeley Softworks' series of GEOS-compatible products opens up a world of opportunity to Commodore users. Take some tips from Mark Jordan and soon you too will be Pumping GEOS.



ART BAXTER

Three issues ago this column got its first taste of laser printing. That article was an interview with the Hughes brothers. I let them design the "Pumping GEOS" sidebar page, and what they sent me was laser-printed. Since then I decided to do all the sidebars that way. This month we'll look at how to do it.

First, a little personal philosophy. When I started this column over a year ago I was working with a fairly primitive GEOS setup. I had no RAM expansion unit (REU), no second drive and a fairly old dot matrix printer. I felt no great need to have a power-user's setup because I wanted to know and show what could be done without a lot of money. It's my personal observation that many magazine columnists get so much of the latest and greatest that they become jaded and eventually lose touch with their readers. I didn't want this to happen.

Eventually, I got an REU and second drive because, quite frankly, life without at least one of the two will eventually cause most GEOS disks to die from a lack of attention. (If you're wondering which is the better investment, get the REU.) But I saw no need to upgrade my printer because I knew that very few of my readers would ever get a laser printer. Of course, I knew about the laser printing services offered. I just figured it wasn't worth the hassle. And besides, what with the new printer drivers available, old Mr. Dot Matrix Printer didn't do so badly himself.

Then came the Hughes article. When I saw the quality of document that a Commodore 64 was capable of producing, well, it was kind of a religious experience. Suddenly it seemed worth the hassle of sending something off to get printed. Folks, it *is* worth the hassle. I'll tell you how much it's worth the hassle: now every time I submit my monthly article to this magazine I have to prepare two times as many disks, envelopes and stamps as I used to in my old dot matrix days. If you knew how much I don't enjoy preparing these things, you'd know how much I like laser-printing. I'm hooked.

When I saw the quality of document that a Commodore 64 was capable of producing, well, it was kind of a religious experience.

But Does It Match?

The first question I wanted answered when I considered having my "Pumping GEOS" sidebar laser-printed was, Can I tell what my final copy is going to look like from my own dot matrix printer? Since I don't have a laser printer at home, I was worried that my perfect dot matrix files would come back from the laser printing company looking different. Since I have to rely on the mail rather than a modem to send stuff in, a week could lapse before I'd realize my mistakes. If my return submission also wasn't right, well, this could get to be a problem. When you're in the magazine writing business, deadlines rule.

The answer to my first question came when I sent in my first "Pumping GEOS" page. What I saw on my screen and printer was indeed virtually what I got on the laser-printed page. I say "virtually" because there were some differences. Of course, many of these I wanted. For instance, the quality of type is different, but that's the whole point. I use the "Lasermatrix" printer driver for my Star SG-10 printer and it does a fine job. But comparing it to laser-printed copy is like comparing dull knives to sharp ones.

Another good difference is that you can forget about line skip—that annoying blank strip that sometimes shows up across the page when the paper feed doesn't quite do its job just right.

And you can forget about any blurring of dots. This can be good and bad, depending on the application. It's good for creating crisp letters and lines. But anything that isn't done in a laser font, any graphic that is imported from *geoPaint,* will have jaggies that are even more pronounced than on a dot matrix. (Compare Ted and Jed's comments in the cartoon in the sidebar.) For this reason, I doubt that I'll ever have any plain old *geoPaint* files laser-printed. But for *geoWrite* and *geoPublish* files, laser-printing is the greatest.

The above differences are to be expected. What you might not expect is that a laser-printed document might pick up a few lines per text column on a page. According to Skip Goetzinger of LaserDirect, the LW fonts print out approximately 15% larger on a dot matrix printer than they do on the laser printer. Skip gave me a very good tip on how to get around that problem: simply print out your document

Continued on page 38

Skip Goetzinger on Laser-printing

On the power of GEOS:

GEOS customers have so much power at their disposal. Actually, they have the capability of a Macintosh for a fraction of the cost. GeoPublish compares favorably with Pagemaker for the Mac, the Cadiallac of the industry. There are more bells and whistles within geoPublish than within Pagemaker. The main drawback is **GEOS** users are giving up a little bit of speed.

On how to prepare a disk to send for laser-printing:

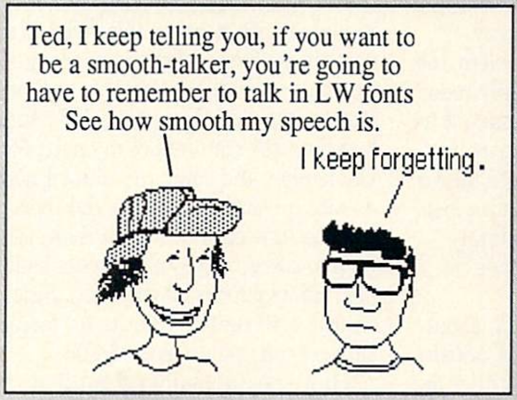
We strongly encourage people not to send us a file until we've mailed them our info brochure. It walks them through the entire procedure. However, if they can't do that, there are a couple key things to do: send a GEOS disk with all the write files you need, the geoPub document, and all of the related text files. Then the only other thing we need is a little document created from geoWrite that you call a "Pay.Info" page. What that tells us is who you are, what your VISA/MasterCard info is, how many files you sent us, what you're looking for, etc. And we encourage you to send us a dot matrix printout of what you expect. That really helps us.

On GEOS possibilities:

You can enlarge documents via the laser printer. If you want a 200 percent enlargement, you'd get an 11" x 17" printout from one 8-1/2" by 11". The resolution is perfect. We can even blow up a 172-point type from Page Graphics mode 999% giving you a near-typeset quality character that's over 2 feet high.

On Tips and Tricks:

To get the best possible resolution on bitmaps imported into geoPublish from geoPaint, draw it big in geoPaint and import size for size into geoPublish and choose the smoothing option. Then use the sizing gadget to reduce it. We reduced a drawing of a sports car that measured approximately 6-1/2" wide down to 1inch. We selected smoothing. It was very difficult for the average person to look at it and think it was not create with a MacIntosh.



On the six most common mistakes people make in preparing documents for laser-printing:

1) Using spaces to align text.. They should let justification do the aligning.
2) Not using the LW fonts. If you want near typeset quality, you must use them (though the other fonts will print out, just not at typeset quality).
3) Not contacting us first.
4) Inadvertently renaming a file when copying a disk over which causes geoPub to look fruitlessly for it.
5) Trusting that 100% of what they see on screen and dot matrix will be what comes out on the laser printout.
6) Using megafonts. Customers should not use these for laser printing. Simply use the LW fonts and size them however big you want. They'll come out looking great in any point type.

On the available laser fonts:

There are eleven total now and we support all of them. But when you buy geoPublish you only get 4 laser fonts. There are two places only where you can get the other seven fonts (Berkeley's never released them.) One is on Q-Link by downloading them from the **GEOS** software library. The other is from us. We put the additional seven fonts on a disk with a style sheet set, put it in a disk mailer and charge $2.50.

On what people send in most for laser-printing:

Number one is resumes. It's probably where the lion's share of on-site correction comes from because resume people, for some reason, do not read any of the material or call for help. Number two is newsletters for churches, Kiwanas, etc.

Continued from page 36

on your regular dot matrix printer with your regular driver to get it just the way you want it. Then change printer drivers to the laser driver, open the document again, and print it out. Then you'll be able to see exactly how many lines are left over. I have found that, with my smaller column lengths on the "Pumping GEOS" page, that this is not really a factor. It would be more noticeable on columns that run the entire length of the page.

There is still one more difference in laser printer output over dot matrix: pattern printing. If you use the graphics commands within *geoPublish* and fill an area with one of the patterns, you won't get what you expect on the laser printer. You may or may not have noticed a slightly different pattern on the left of the "Pumping GEOS" sidebar since I began using laser output. The inside box under the large vertical words *Pumping GEOS* should be (and used to be) a diagonal line pattern. However, the laser printer turns it into simply a darker dot pattern. I did not find it objectionable so I kept it that way.

There is a way around this problem, too, but it's a bit of work. I could simply redo that entire logo in *geoPaint* and save it as a group of photo scraps, then import it that way into *geoPublish*. It would take a little fine-tuning to align everything just so, but once it was done I could simply save the structure as a Master page library and never have to redo it.

One other point should be made about graphics being laser-printed. *GeoPublish* offers both bitmap graphic capabilities as well as "object-oriented" graphics. I'm sure you're familiar with bitmap graphics—that's what *geoPaint* produces in the form of document and photo scraps. Object-oriented graphics are what you get if you draw with the graphics commands available in *geoPublish*. Though they will appear on the screen with the same resolution as their bit-mapped brethren, they will be printed with much greater smoothness if done on a laser printer. This goes for using the smoothing feature (for text and graphics) as well: if it's done in Page Graphics mode, it'll be smoother than if it's imported from *geoPaint*. Obviously, you can't always choose the object-oriented graphics. *GeoPaint* is the only way to do some things. But if a situation arises where you can draw with *geoPublish*'s tools instead of importing a graphic from *geoPaint*, do it. You'll be impressed with the results.

You may think that it sounds a little much to keep track of but it isn't. For most projects, you just send in the disk and back comes the typeset-quality printout. Please read Mr. Goetzinger's further words of wisdom on the subject in the interview over there in that laser-printed sidebar.

Preparing a Work Order

The second question I wanted to know about when I sent in my first disk to LaserDirect was this: What all needs to be on the disk? I assumed that I needed a disk prepared exactly like the one I used to produce the document. I placed the *geoPublish* program on the disk (though I later found out I didn't need to), my *geoPublish* application file, all the text files needed, all the fonts needed (or so I thought—I goofed and left two off), and the laser printer driver. I slipped everything into a disk mailer including a sheet of paper with my name, address and credit card info on it, as well as a short note describing what I wanted done. I had no information to go by and I needed it fast. Less than a week later, my document returned. Included with it was a two-sided Error Report sheet. Three errors were marked. One was this: "We did not receive authorization for On-Site Corrections." Fortunately, based on the contents of my note, Mr. Goetzinger and company knew I needed on-site corrections, so they did them. The invoice showed that it took them ten minutes to correct my problems (as I said, I also left two fonts off the disk). Since they charge $.40 cents a minute for correction time, it cost me an extra $4.00.

I have no complaints about that whatsoever. However, I could've avoided that cost had I taken the time to write to LaserDirect and request an Info brochure which details the entire process of submitting work orders. I know that you won't be like me because you're not the type to wait until you absolutely have to have the service before contacting the company. You will write ahead of time, get the info brochure, and read it carefully. You're like that, right?

Well, if you too suffer from the I'll-worry-about-it-when-the-time-comes disease, you should pay special attention to Skip Goetzinger's words in the sidebar. His advice applies whether you use LaserDirect or some other service.

There is another procedure entirely for submitting work to LaserDirect and that is via QuantumLink. Those of you who subscribe to Q-Link are likely know this. That method is faster, it's more 1990's-ish, and it's how LaserDirect does approximately 90% of its business. I have a feeling though that many of you are like me—for some reason or the other have never gotten into telecomputing. Don't let that prevent you from using the service. My experience has been that a Monday mailing nets a Friday return. I can live with that.

I suppose the reason I can live with that is because I don't plan to use laser output for all my printing needs. The only times I think it appropriate for me is (1) for this column, (2) for any newsletter I might produce, or (3) for any important handbills, posters, advertisements, whatever, I might do in the future.

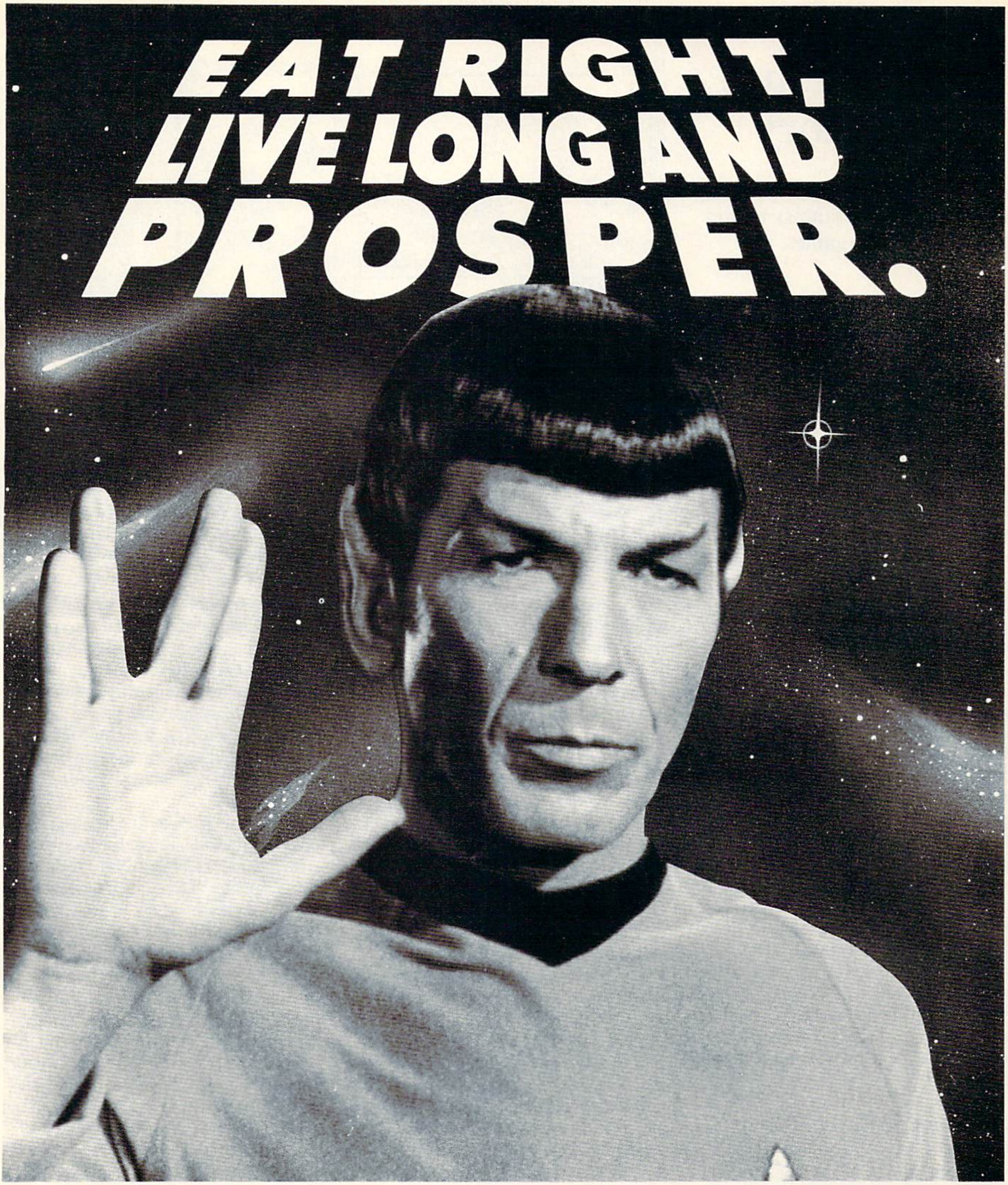
As I have said already, I am hooked on laser printing. You may then wonder, is this guy ready to shell out $3000–4000 for a laser printer? (And don't be deceived by laser printers advertised for less: if it doesn't have PostScript™ capability, you might just as well not have it. All you'll get is sharp dots at dot matrix resolution.) The answer is No. Do you realize how many documents I'd have to print to get that baby to pay for itself? LaserDirect is typical of all laser printing firms in their pricing: $3.00 for the first page, a buck a piece for additional pages, $2.25 for shipping/handling, and any overtime work. That means my one-page "Pumping GEOS" sidebar costs a little over $5.00. I truly hope this column has longevity, but I have my doubts it will last 60 years, which is how many it would take to make the investment worthwhile.

When the price gets down to a grand, then I might change my mind. I admit, it would be nice to do a *geoPublish* page in less than a minute. But so would a new camcorder be nice. And a new couch wouldn't be un-fun. Nor a dishwasher, a new used pickup truck, or a college education for the kids. It's good, at times, to prioritize. I hope this article doesn't sound like an advertisement for LaserDirect. There are others who will laser-print Commodore files for you. LaserDirect is the most well known, it's the one Berkeley promotes, and it's the one I have experience with. I must say this about them: they are a thoroughly professional company. Their address follows this column.

With laser-printing capabilities, the Commodore 64/128 computers have the ability to produce pages that are truly professional in quality. In my opinion, you haven't really Pumped GEOS until you've done a couple reps with a laser.

Write to LaserDirect at: P.O. Box 20829, 6831 West Howard Avenue, Milwaukee, WI 53220.

This space contributed as a public service.



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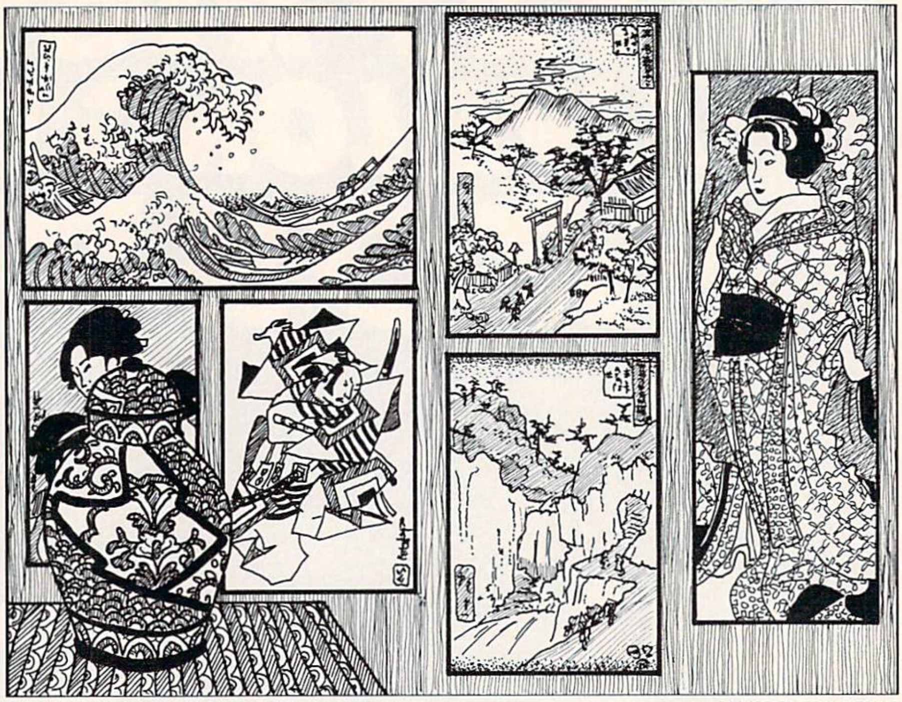
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by Shay Addams

Every Picture Tells a Story

News and opinion from a leading explorer of those fantasy realms called adventure games.



DENISE FALESKI VITOLLO

Don't it? At least that's what Rod Stewart told me after playing Infocom's new illustrated adventures *Journey, Shogun* and *Zork Zero*. (OK, I lied . . . it was really Jimmy Stewart—or was it Jimmy Swaggart?) When Infocom, long known for its "text-only" adventures, announced plans to teleport into the world of graphic games, adventurers around the world were left as puzzled as I was the first time I entered the Loud Room in *Zork I* (also the next 125 times!). Now that the games have arrived, so has the answer to the question on every InfoManiac's mind: is this the end of the world, or a bridge into a new one where we can have even more fun?

Zork fans will be glad to hear that Steve Meretzky's prequel to *Zork I* is as funny as his *Planetfall*, that only a few clues are based on or embedded in the pictures (so it, as well as *Shogun*, is still essentially a text adventure), and that the Infocom parser is smarter than ever. Like *Beyond Zork, Zork Zero* offers auto-mapping. *Shogun*'s graphics, like those in *Journey*, are used mainly to enhance the atmosphere of the novel that inspired the TV mini-series that led to the adventure game (designed by another Infocom veteran, Dave Lebling). *Zork Zero* and *Shogun* are closely related to the original Infocom style of adventure, and are dubbed "Graphic Interactive Fiction." *Journey*, however, introduces a new genre Infocom calls "role-play chronicle."

Journey—The Game, Not the Group!

Written by Marc Blank, one of Infocom's founding ZorkMasters, *Journey* combines elements of the illustrated text adventure (over 70,000 words of text, accompanied by about 150 pictures), with some elements of fantasy role-playing (you're directing the actions of a group of adventurers who possess unique skills and are out to accomplish a long-range goal). The story is emphasized over the combat and dungeon-delving done in a straight RPG like *Bard's Tale*. Another thing this "role-play chronicle" shares with such games is that after completing each quest, your group returns to a Wizard for its next assignment.

That Wizard is Astrix, the last of the "true wizards," and one of the first things you've got to do is find him, high atop the Sunset Tower. Astrix alone knows how to halt the Dread Lord's five-year series of plagues, disease and famine that still devastate the land. The Seven Stones, magical gems that were scattered amongst the Dwarves, Elves, Nymphs and Wizards long ago, must be found and reunited, which turns into a three-stage quest whose puzzles grow increasingly more difficult.

A New Interface for Infocom

Text scrolls up the right window, which represents your character's journal of the quest, while pictures fill the left one. Below, a "context-sensitive button menu" awaits the click of your mouse. That means the options in the menu change in many situations, depending on who's in your group, the items you're carrying and other factors. For example, if Hurth the Dwarf is in the group, you'll get an option to "read rune" at times, a skill other characters don't possess. But you won't have to worry about skill points in this game—nor must you fret over hit points, spell points or any other kind of points, for these elements of the RPG were left behind, allowing you to become more engrossed in the story than keeping track of numbers. Various people may join the group, for a maximum of five members, and their assistance often proves invaluable. Some will "Tell Story" or "Tell Legend," which illuminates the rich background of this new fantasy world's myths and monsters.

Some choices are for the whole party, others for individuals, and some are for saving games and related functions. Combat is a matter of choosing a tactic such as flank and maybe a spell, then clicking on "combat" and reading the results in the main window. This kind of interface is nothing new, but is smoothly implemented here. The main drawback is that you can't directly get or use things in your inventory, which limits your freedom to "fool around with things till something works." When you choose the proper option and possess the right item (such as rope) in the correct situation, the text describes how you then use it.

Puzzles remain true to the Infocom tradition, but Blank adds a twist with his magic system. To solve certain problems, you've got to cast spells (such as glow, lightning and elevation) that require your magician to combine one or more of the four essences of air, fire, earth and water. Spells are listed in a menu, but only those for which you've got the right essences

Continued on page 69

by Robert W. Baker

New Library Searches

Explore the inner workings of the Q-Link telecommunications service with network pro Bob Baker.



One of the newest features on Q-Link is a search facility for the download libraries. This new service will allow you to quickly locate files of interest without browsing the various library areas. Ever want to find all the sector editors that are available, or the new games uploaded in the past week? Now it will be very easy to quickly find whatever you want.

The download files will all be indexed by their subject line, filename, uploader user-id, and additional keywords that can be assigned to any given file. At first, there will be one specific keyword assigned to every file in a given library, with each library having its own keyword. Additional keywords will be added as needed, so we can quickly find programs mentioned in magazine articles, music files for the new services, and more. Each file can have around 200 characters' worth of keywords assigned to it, so there is plenty of room for refinement.

With the new search function, you'll be able to limit searches by machine type (Commodore 64, 128, Amiga, etc.), operating system (BASIC, GEOS, etc.), and other categories. There will also be a way to limit the search to only those files uploaded in the past week, the past month, or all files regardless of upload date.

Whenever more than 20 files are found that meet your search criteria, you'll be asked to narrow down your search so that a more reasonable number of entries are found. However, when you do get the list of matching entries, you will have access to the whole text description of the file and possibly even the comments associated with that file. The folks at Quantum were still working on some of the capabilities of the new search feature, so be sure to check the online descriptions for more details on the final implementation.

By the way, the new search capability is a very fast indexed search with a new database rebuilt every day automatically by the system. It's based on some of the features of the on-line Encyclopedia, so that should give you some idea of how it works and how fast it can be. There may also be some special searches within Music Connection for handling the various music files you'll be able to use there too. It all sounds exciting, and I can't wait to see it in action.

Here's a handy hint from "Lordholder" that promises to save wear and tear on the fingers when playing slots in the RabbitJack Casino. Before using your Q-Link disk, simply enter the following BASIC command on your Commodore 64:

```
POKE 650,128
```

Then load the Q-Link software and go to the casino as usual. You'll find that you only need to hold the F3 key down while touching the SHIFT key to spin the wheels. The bets are placed automatically and no more pumping of the F3 key. Unfortunately, you have to back out *carefully,* since every key you press (like F5) is automatically repeated for you! If you're not careful, you'll zoom right out of all the sub-menus.

Another tip from "Jeff I Am" says that you can use the COMMODORE key in most cases just like a SHIFT key. Plus, names of rooms in People Connection and user-ids have to be spelled correctly, but the spaces don't seem to matter. "Jeffiam" works the same as "Jeff I Am" with or without the spaces. This same trick works in reverse too! You can add extra spaces to any user name or room and still address the same person or area. Thanks Jeff, I never really noticed this one!

In last month's column I mentioned that Music Connection had been added to the system. The Sysops of the Music Connection area have informed me that they're planning a lot of support for the new features. There will be a new Music Connection Support Area right in the Music Room. It will have libraries of the featured files and the SID Player that members can use to play their SID files after they get offline. Plus there will be message boards where you can ask questions about SID and Music Connection.

The Music Room will also be opening the Music Room Pub and the Music Room Bar in People Connection each night from 7:00 p.m. until 1:00 a.m., hosted by knowledgeable and fun SID folks! Plus, the Music Room Wednesday night SID conferences will be moving from CIN to PC, so they can use the Music Connection capabilities to demo the things they're talking about.

Be sure to check the Customer Service area occasionally for the latest system news. Don't forget that this is a free area included with your basic service, so make use of the time-saving pointers and tips available there. You can quickly find out about the latest system updates and news of new features without browsing around the system.

Now On To PC Link . . .

In the introduction to the PC Link service in last month's column I glossed over the message boards and download libraries pretty quickly. It might be worth taking a closer look at this area before going on to other areas of the system, as these features are common to most areas. I already mentioned the window displaying eight of about 22 entries in a message board or library, and how you have to scroll this window up and down to see all the entries. Let's take a closer look at the entries themselves.

Each folder in a message board appears as a single-line entry when you first enter a message board. Each line indicates the message title, the number of messages in the folder, the date the original folder was created, and the date the last entry was added to that folder.

When the first list of folders has been transferred to your system, the top line of the box will be highlighted. You can then use the cursor up/down and page up/down

keys to move the highlight to the desired folder and scroll through all 22 entries available at that time. If the desired folder is not within that group, you can use the "More . . ." button to get the next group of 22 entries, and continue to move through the area until the desired folder is found.

Once the desired folder is highlighted, you can then press ENTER or the TAB key and the appropriate button to display the contents of that folder. When several messages appear within a given folder, each message will be shown by a single-line entry that gives the date the message was posted, the user-id of the person who posted that message, and the title line of the message itself. Again, move the highlight to the desired entry and press ENTER or the TAB and button to display the message. You can read the messages in a folder in any order desired.

Each message includes the subject line, posting date and user-id of the person who posted that message (as shown in the folder index). There is also the actual time the message was posted, the date of the last entry in the current folder, and the total number of messages in that folder. This information is all grouped at the top of the message as a standard message heading for all messages on the system. The actual message that follows is then standard text of up to approximately 4K in length. Each line within the message is limited to 69 characters to fit within the limits of the Deskmate box enclosing the text.

When displaying a message, you can use the cursor up/down and page up/down keys to scroll through the message, even while it's being received. If you suddenly decide the message is not of interest, you can press [CONTROL A] to cancel the message at any time. However, be aware that there are still occasional system problems associated with canceling operations using [CONTROL A], and you may suddenly find yourself disconnected from PC Link for no apparent reason. So for now, use [CONTROL A] with caution.

Entries in the download libraries are similar in structure, but actually include much more information. When you enter a given library, each file in that library is shown as a single-line entry. Each line indicates the date the file was entered in the library (when it was made live and available to the public), the subject line describing the file, the download count and the date the file was last accessed. If the download count is one, the last date shown will indicate the date the file was actually uploaded to the system. After the file is downloaded and the download count is two or more, the last date will then indicate the date of the last download.

When the first list of directory files has been transferred to your system, the top line of the box will be highlighted. You can the use the cursor up/down and page up/down keys to move the highlight to the desired folder and scroll through all 22 entries available at that time. If the desired file is not within that group, you can use the "More . . ." button to get the next group of 22 entries and continue to move through the area until the desired file is found.

Once the desired file has been found, you can then use the appropriate buttons to display the file description or download the file. When you display the file description, the screen will include the file description or subject line, uploader's user-id, and the date and time the file was uploaded. The file description will also include the current download count, the length of the file (number of bytes), and the estimated download time at 2400 baud. Additional information may indicate the program author, required hardware or software, and other vital information.

Each program description will contain information unique to that particular file, including installation and running instructions where appropriate. Be sure to read through the information and save a copy to disk if you think you may need a copy later. Besides downloading the selected file, you can also enter comments concerning that file. However, unlike Q-Link, your comments are directed to the Sysop handling the associated library area instead of being immediately added to the program description. The Sysops will then review the comments and either respond via Email or attach the comment to the appropriate file for others to access.

To download a particular file, simply use the Download button and enter a new filename for the file if desired. The download will then be automatic, and a progress meter will indicate the approximate status of your download as it occurs. When the download is completed, press the ENTER key to confirm the end of the operation and return to the library menu.

Guess that wraps things up for another month. Look for some really exciting Q-Link news next month! As usual, you can reach me daily via Email to RBaker on Q-Link or to RBaker PC on PC Link if you have any comments or questions concerning this column. ■

Continued from page 17

Eventually, you should try to get close enough to board and capture the ships. Unfortunately, too much emphasis is given to boarding the enemy's ships. Every time you form a boarding party, a crew watch group is turned into the party, leaving one less crew watch group on board your own ship. You shouldn't be allowed to put all of your crew members into boarding parties, but *Wooden Ships* permits it.

On the flip side, you can't tow any of the captured vessels, and the capturing crew can't sail the ship it has taken over. Disallowing these features makes *Wooden Ships* more unrealistic.

In combat, damage can be done to rigging, crew, hull and guns; each of the point totals associated with these ship areas are reduced by amounts shown in hit tables. While you are trying to make direct hits on enemy ships, you should also try to outmaneuver these ships to avoid their fire.

Wooden Ships & Iron Men takes many factors of high-seas battles into account. Two added features of the game are the well-written manual and the Dockyard program. The manual contains all of the valid charts used by the game and complete descriptions of all factors associated with the scenarios that come with the program. In addition, the manual includes three articles about the age of fighting ships that offer a lot of hints and historical insight. The Dockyard program is an easy-to-use construction kit that allows simple assembly of fleets and instant design of game maps.

So far, I've mentioned a few of *Wooden Ships*' shortcomings. These last complaints are important ones that should be taken into consideration in future versions. Weather and time are not factors in *Wooden Ships*. There are no night battles, rain, sleet or fog. Also, the vast amount of smoke generated by firing cannons is not present in the game. In real life, visibility would be blocked by the smoke from battle, as depicted on the game box. Finally, there are no options or commands to move your ships all at once in a group—you can't "connect" the ships together.

All in all, I was very pleased with *Wooden Ships*. It is one of the few games that goes into such detail about ships of the golden age of sailing. Only with *Wooden Ships* can you pit a Venetian gondola against a British frigate in your own scenarios and relive such famous battles as Trafalgar and the Battle of Lake Erie. Now shove off, matie! ■

by Matthew Leeds

The HDTV Battle

When was the last time you looked at your TV? I don't mean watched it, but really looked at it. Television looks terrible. The colors are not true, the image is unsharp, the sound is awful, and the almost square format ruins wide-screen movies. Just compare your television's picture to that of your Amiga and you'll see what I mean. Television looks terrible.

For years the television industry has been working on improving the quality of its image (this is separate from the quality of their programming). Various proposals have been suggested, committees have been formed, studies have been commissioned, and suggestions put forth. Why is it then, that so far we are still watching the same lousy pictures?

The answer is an intriguing mix of technological infighting, political power plays and national chauvinism. Eventually you will end up owning a new television set, a High Definition TV (HDTV). Just what that set will cost, what it will offer, and where the signal it displays will come from will depend on who wins the HDTV battle.

HDTV is a loose term used to describe a variety of technologies that offer an improved television image. Generally these include increasing the number of horizontal scan lines from the current 525 lines to something over 1000 lines, changing the current format of the screen from a 4:3 ratio (1 to 1.33) to something closer to wide-screen film ratios like 20:9 (1 to 2.2), improving the quality of the audio (although this seems to be a minor concern both in the technical and political discussions), and improving both color fidelity and perceived sharpness.

The basic issues around which the HDTV debates revolve include:

1) Most, but not all, HDTV technologies cannot be broadcast over the current 6MHz channel bandwidth that the FCC allows for television.

2) Most, but not all, HDTV technologies cannot be received by current television sets.

3) Almost all HDTV broadcast schemes cannot be broadcast over current broadcast equipment.

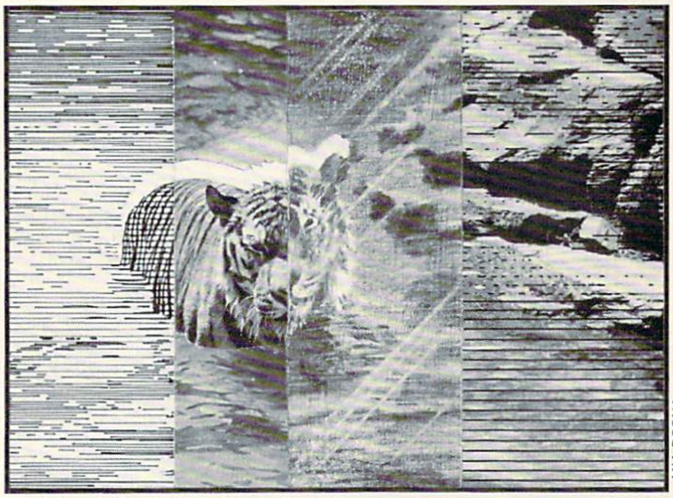
4) Almost all HDTV technologies require massive investments in new production equipment—cameras, videotape recorders, editing equipment, etc.

5) Virtually all HDTV technologies imply radical changes in the way television will be produced, distributed and viewed. These changes will affect the major networks, cable companies, television equipment manufacturers, consumers, advertisers, government agencies and international relations.

No wonder that HDTV is no longer just a technological problem. However, understanding the technology is essential if you want to follow some of the political maneuvering that is currently going on, and in the long run it will let you appreciate just how difficult resolving all of the issues regarding HDTV will be.

NTSC—The Big Hurdle

We should start by looking at the current state of affairs, NTSC. By and large it is the heart of the current debate. NTSC is the FCC-mandated standard used for broadcast television. It was created in the early '50's as a compromise; it allowed existing black and white TV sets to accept the newly created color signals and still display a B&W image, and it fit into the broadcast spectrum allocated by the FCC. It was by no means a good compromise, but the state of technology at the time did not permit a better one.



MIA BOSNA

NTSC suffers from several defects. Lack of detail, color shifts, ghosting, visible scanning lines, interlace jitter, motion artifacts, an aspect ratio incompatible with film, rotten audio—the list goes on. These defects occur at different points in the signal chain: production, post-production, encoding, broadcast, reception, decoding, display. Most can be addressed by existing technology, and in fact one system, IDTV, is available today.

Improved Definition TV attempts to address NTSC problems at the reception, decoding and display end; in other words, a better television set. Toshiba, Phillips, Mitsubishi and Sony have all introduced IDTV sets. Each uses some method of doubling the number of scan lines that are on screen at any given time. This non-interlaced image is similar to that achieved via MicroWay's flickerFixer on the Amiga. It also can suffer from the same defect—smearing of fast-moving objects on the screen.

Since a screen image is created from two fields, interlaced to create a single frame, fast moving objects can change position between fields. If the first field is buffered in memory and then displayed with the second field, this can cause smearing. Strategies for avoiding this smearing include motion-adaptive line doubling (detecting if a pixel has moved since the last field), digital interpolation via a median filter (digital guessing as to what to fill the missing lines with), and various field and frame memory storage techniques.

Spinoff advantages include improved resistance to ghosts and noise via frame memory storage comparisons (was there a white dot in this position in the last field?), perfectly sharp freeze frame (just use the frame memory to display an image), and all sorts of picture-in-picture possibilities.

There is also a proposal to approach the problem from the other end: production, post-production, encoding and broadcast. Faroudja Laboratories, Intelvideo and Central Dynamics have all developed high-quality encoders that are compatible with the current NTSC standard. They all believe that although NTSC is by no means the best color television broadcast system, we are still a long way from making the best use of it. New developments in video technology allow for dramatic improvements in NTSC encoding using digital comb filters, pre-filtering, gamma correction, image enhancement and rigid adherence to FCC standards. Although the improvements are not as dramatic as

prototype HDTV systems, they are far better than the stuff you and I are getting at home, and they would be viewable on our current TV sets.

On the HDTV Horizon

On to the HDTV proposals. The oldest, and the inspiration for much of the political and industrial jockeying going on, is the MUSE system. Proposed by Nippon Hoso Kyokai (NHK), the

In fact the idea of using a computer monitor to view HDTV signals has more than a little relevance.

Japan Broadcasting Corporation and principal researchers of HDTV throughout the '70's, this is actually a family of production, transmission and receiving schemes that is scheduled to become available next year in Japan. MUSE recognizes that different standards may be applied in production, distribution and reception. It uses a 1125 line rate and a 60 field/sec rate.

For contrast, NTSC uses 525 lines and 59.96 field rate. Yes, I know you've been told NTSC uses a 60 field rate, but it isn't so. The difference may seem minor, but believe me it is not. For most discussions of television the difference between 60 and 59.96 is ignored, but it exists, and in HDTV it makes a big difference. A short technical digression will explain why NTSC uses 59.96.

The sound carrier in NTSC is at 4.5MHz. The color sub-carrier is at 3.58MHz. There is a beat frequency that develops between these at 0.92MHz. It can be minimized by keeping the difference between the sound carrier and the video carrier at some multiple of the horizontal scan frequency. To avoid this beat the horizontal scan frequency was adjusted from 15,750Hz to 15,734.26Hz. This necessitated a color subcarrier of 3.579545MHz. From this color subcarrier you can derive the new vertical scan rate (field rate) by this formula: Vertical scan rate = (2/525)*15,734.26 = 59.96 Aren't you glad you asked? None of this is necessary in HDTV.

The MUSE system requires much more bandwidth than the FCC allows for a single TV channel. The current limit is 6MHz, and an uncompressed MUSE signal require close to 100MHz; 30MHz for R, G and B, plus audio and sync signals. There are various compressed MUSE systems proposed; for satellite transmission, for direct broadcast to homes via small antenna dishes at each home, some are compatible with current FCC standards and/or current TV sets with some loss of quality. The direct broadcast MUSE-E is an 8.1MHz signal with four channels of digital audio and an aspect ratio of 1.67 or 15:9. Additional MUSE systems would take advantage of adjacent channels, by using a regular broadcast channel, plus half of an adjacent channel to broadcast the 8.1MHz signal. This channel-and-a-half idea is not unique to MUSE.

In Europe, the field rate on PAL television is 50, with 625 lines. They rejected the MUSE system as incompatible with their current format and proceeded to develop their own HDTV format. The simplest system was to double the line rate to 1250 and retain the 50 field rate. Once all hope of a universal standard for HDTV was lost, American companies began to think up their own formats, most based on doubling the line rate from 525 to 1050, with field rates of either 59.96 or 60. A recent count of proposed standards shows over 20 worldwide.

In the U.S. things have been complicated by the fact that the FCC has mandated that any new HDTV broadcast standards must adhere to the 6MHz bandwidth limit. They have, however, left open the door to the channel-and-a-half concept sometime in the future. An FCC study shows that 100% of all current American broadcasters could be given an additional half channel's bandwidth allocation if it did not need to be adjacent to their current channel. The percentage falls to 77% if it needs to be adjacent. Finally the study said that two channels could be made available if not adjacent to about 96 percent of broadcasters. This seems to indicate a preference for a split signal with each portion no more than 6MHz.

This is in fact exactly what the front-runner in the U.S. is proposing. The David Sarnoff Research Center has proposed something called ACTV. This is a two-stage system: ACTV 1 and ACTV 2. ACTV 1 is fully NTSC compatible, but to get the benefits you would need a new television. It would be followed by ACTV 2 which is a 1050 line, 59.96 field system that would require a second channel's bandwidth. It also offers digital audio and an aspect ratio of 1.78 or 16:9. The plan is to start with ACTV 1, wait for HDTV's to be purchased by the consumer to take advantage of the improved signal, then switch over to ACTV 2, which offers an even greater improvement over NTSC, once the installed base allows for it. At this point, a standard NTSC signal would replace the ACTV 1 signal for those who still owned traditional NTSC TV's. Note that this starts off by using channel-and-a-half, but ends up using three channels, two for ACTV and one for NTSC.

Of course the broadcast bandwidth problem goes away if you don't have to broadcast the signal. Cable television doesn't really care exactly how much bandwidth it requires to distribute a signal (within limits), they are far more interested in what you plan to connect to their signal, i.e., what kind of HDTV set are you likely to own? One interesting possibility is that of a standards converter that would let you view a "cable standard" HDTV signal on whatever kind of monitor you owned. There would be no need for it to be a television or for it to support any particular standard. This of course is just a concept at this point, but imagine either a box converter or a monitor that accepted cards just as an Amiga does. Cable has been lobbying for an 1125-line or better signal, with a preference for a 60 field rate to match existing HDTV equipment. Of course, this might lock out the broadcast industry for a while, but the cable companies don't seem to mind.

In fact the idea of using a computer monitor to view HDTV signals has more than a little relevance. Much of the political noise regarding HDTV revolves around the application of HDTV technology to military, scientific and industrial uses.

On a strictly technological consideration, several HDTV proposals deal with the concept of "square pixels." Draw a square on your monitor, then rotate it 90 degrees. If the monitor has more pixels in either the horizontal or vertical direction the square is now a rectangle. None of the front-running HDTV proposals deal with this issue. Computer workstations use 1000-line and better monitors already, some with wide-screen capabilities for two-page displays in desktop publishing applications. These monitors are expensive, but a mass-produced HDTV television would drop their cost radically.

Before I deal with the other political issues I want to address, there's one last technical detail to consider: going from film to video. In the States, film is projected at 24 frames/second. This makes it difficult to transfer film to video with its frame rate of

30 (or 29.97 to be precise). To resolve this a scheme called "3-2 pulldown" was devised. Each alternate film frame is displayed for three fields of video, yielding six extra frames for a total of 30. This creates all kinds of editing problems later for the videotape, as every other video frame has a different film frame in each field. I know it sounds confusing, but it is important as far as adopting a universal HDTV standard goes.

In Europe, film is shown at 25 frames per second. This eliminates the need for 3-2 pulldown, as the PAL video frame rate is also 25. If Europe adopts an HDTV standard with a frame rate of 30 they will be stuck with 3-2 pulldown, something they see no need of.

The other film-to-video issue is "pan and scan," the process of fitting a wide-screen film image onto a narrow-screen television. Only a portion of the film image is scanned as the operator of the scanning system decides what portion of the film image to crop, and only a portion of the full image ever makes it onto your screen. The alternative to this is "letterbox scan," a process that gives you the full film image but leaves black borders at the top and bottom of your screen. This is why the selection of an aspect ratio is so important.

Now for a quick political update. The U.S. Defense Advanced Research Projects Agency (DARPA) has $30 million in grants available for HDTV research. Just under 100 firms have applied, including foreign-owned Sony and Phillips, two HDTV innovators. Commerce Secretary Robert Mosbacher stated, "We should insist that United States firms closely benefit from the effort." The Defense Department initially cited federal procurement rules on open competition that require acceptance of foreign bids, but a week later relented, and stated that only U.S.-based companies would receive funds.

The "High Definition Television Cooperative Research and Development Act of 1989" would pump $500 million of federal funding into HDTV R&D, at about $100 million per year for the next five years. The "National Cooperative Innovation and Commercialization Act of 1989" would lift some antitrust barriers that currently block joint ventures in this area. The "Capital Investment Act of 1989" seeks to cut the capital gains tax for some HDTV ventures. The "High Definition TV Competitiveness Act of 1989" would establish a permanent R&D tax credit for U.S. companies involved in HDTV activity. It also would lift some antitrust barriers, examine trade laws to promote U.S. HDTV production (read protective tariffs), and encourage the FCC to finalize an HDTV transmission standard.

Why so much action? The Congressional Research Service compiled a report for the House Telecommunications Subcommittee that predicted a $263 billion global market for home HDTV television sets and videotape recorders by the year 2010. A more conservative estimate put the figure for U.S. consumers at only $70 billion by the year 2008.

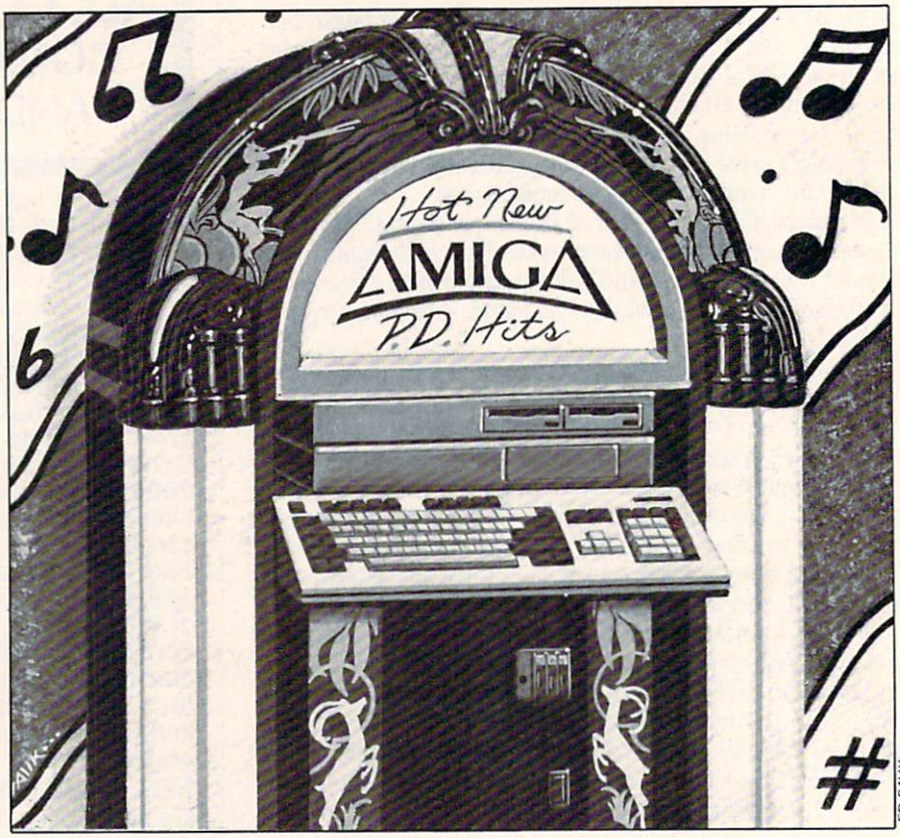
For perspective, both on the potential financial impact of HDTV commercialization and on the trend towards domestic protectionism, consider these figures from the HDTV Information Center:

- U.S.-manufactured color TV's accounted for almost 70 percent of the total TV's sold to consumers in 1987—$5.3 billion at retail. Twenty companies manufacture color TV's in the U.S.
- Virtually all color TV's 20 inches and larger sold in the U.S. are produced in the U.S.
- Fifty percent of all 13-inch to 19-inch color TV's sold in the U.S. are produced in the U.S.

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by Graham Kinsey

Amiga Public Domain



ED SAUK

The Fred Fish library is expanding by leaps and bounds these days! This month's column is devoted almost exclusively to new Fish disks, as I review programs from Fish disks 173 through 194 this month. Also this month is yet another important update to VirusX. (If you *still* aren't running VirusX, now you have several more reasons to do so!)

For each program, the author is given when known, along with the Fish series disk number (when applicable). If I obtained a PD program directly from PeopleLink's AmigaZone, I instead list the AmigaZone download file number. (If no file number is given, the file may still be on PeopleLink, but I obtained it somewhere else.) When a public domain program has been classified as shareware, this is also mentioned, with the suggested amount.

Due to the large size of animations that are coming out for the Amiga, assume that the normal size of an Amiga animation is one megabyte. Unless I specify otherwise, *all* animations reviewed here require one megabyte.

IffLib: by Christian Weber (Fish 173)

For programmers who need to access IFF ILBM pictures, this IFF library saves some work. Included in the library are routines for opening IFF files, obtaining the BMHD, CMAP or BODY portions of an IFF file, saving a clipped portion of an IFF file as a separate picture and others.

Tetrix: by David Corbin (Fish 173)

A public domain version of the already famous Soviet computer game *Tetris*. Options include difficulty levels and starting levels, plus toggle option for sound and for displaying the next piece. For those who haven't seen *Tetris*/Tetrix, it's a very simple block manipulation game which also happens to be very addictive!

Castle: by H. James Fox (Fish 174)

A very simple yet fully functional illustrated text adventure game. The only problem I had with this game is that whenever a new scene was loaded, the text entry window was deactivated, forcing the user to click on the window each time. This makes the game's user interface unfriendly for those who don't want to use the mouse.

Titlepage: by Joel Swank (Fish 174)

To add a bit more flair to book reports or other multi-page documents try Titlepage. In addition to supporting any font type and point size, Titlepage also has options for condensing the text, attaching the date to the title page, toggle options for NLQ, elite, lines (either six or eight) per inch, italics as well as graphics character support enable/disable.

Elements: by Paul Thomas Miller (Fish 175; Shareware: amount not specified)

This program displays the periodic chart of the elements. Although the display is mostly monochrome, elements that are not in solid state at 300 degrees Kelvin are displayed in a different color (red for gases, blue for liquids). In addition, all synthetic elements' symbols are rendered with an outline instead of being a solid green like most of the elements.

If you click on an element, the program will display a wealth of information including the element's stable form, atomic weight, melting and boiling points, electronic configuration and oxidation states, density at 300 degrees Kelvin, atomic radius and volume, first ionization potential, specific heat capacity, electronegativity, heat of fusion and vaporization, and other figures (assuming that this information is known to scientists at this time).

Also included is a simple line drawing of the crystal structure of the substance. Menu options give information about subatomic particles, known radioactive isotopes for various elements, and a percentage chart corresponding ionic characters with the difference in electronegativity for any two bonded substances.

Needless to say, this program can be quite handy for any student, teacher or researcher of chemistry.

Furnish: by Terry Gintz (Fish 175; Shareware: amount not specified)

A simple program for designing the furniture layout of a room. Graphics, including furniture pieces as well as the rooms themselves, must be created in a paint program before this program can be of any use. In addition to moving any one object, you can rotate (in either direction) or flip

an object if you don't like it's current orientation. You can only work with ten pieces of furniture at any one time (due to memory limitations), which seems a bit unreasonable. This program is fairly no-frills, but works as intended, although disk access is rather slow.

SendMorse: by Joe Larson (Fish 175)
SendMorse is for those who have never heard morse code before, or for those who just want to practice what they've learned. The program will take any ASCII text file and output morse code via the audio device. The output rate is user-definable.

HyperNet: by Glenn Everhart (Fish 176)
This program is a Hypertext shell which, although functional, was created mainly to demonstrate the hypertext concept, especially on a multitasking machine. **WARNING:** Whenever I try to run this program, my Amiga immediately locks up, so use this program *at your own risk*.

Jask: by John Barshinger (Fish 177)
Jask is another program that replaces the AmigaDOS Ask command with a version that supports gadgets. You choose not only what is to be asked of the user, but also what strings show up in the affirmative and negative gadgets boxes. There are also options to choose the default choice (i.e., if no choice is made within the user-definable time allotted to answer the question) and an option for the requester to scroll up to the final position (which if nothing else, will certainly grab attention). Jask assists developers and user group librarians in creating bootable disks that are as easy to use for the neophyte Amiga user.

Path: by Rico Mariani (Fish 177)
While is it relatively easy to specify via AmigaDOS's Path command which directories will be searched for when attempting to load in a command, specifying the *order* AmigaDOS should follow when checking all the various directories is not so easy. Rico's Path makes this easy. With Path just create a simple text file that lists the order in which directories should be searched, then run the Path program. If you tend to run an AmigaDOS environment utilizing storage devices of different speeds, this Path program should help you to reduce file access time as much as possible.

Cosmic: by Carl Edman (Fish 178)
A routine cosmic conquest game for up to four human opponents (with computer opponents filling any empty seats). You use the population and mineral resources of your home world to colonize and control (via military might) the entire 16-star galaxy that makes up the Cosmic universe. A simple color ASCII screen serves as the playfield. There are dozens of different starships that can be built, and other aspects of the game offer a reasonable level of complexity and challenge.
The only notable problem with this game is that it while it uses the mouse pointer for some input, every time you click on the Cosmic screen, the mouse pointer vanishes from view (you are forced to click on another screen to unblank the mouse pointer).

DietAid: by Terry Gintz (Fish 179; Shareware: amount not specified)
An update to the original version on Fish 36, this program will help those who are counting calories. DietAid knows about hundreds of ingredients, and more can be added. Once you have chosen the ingredients (including all proper measurements for each), DietAid will display total calories for the meal, or percentage breakdown by protein, carbohydrates and fats. You can also adjust the figures according to the number of portions consumed. Results can be saved and/or printed at any time.

TSnip: by John Russell (Fish 179)
TSnip is similar to Scott Everden's cut and paste utility SnipIt, but TSnip supports a few features that SnipIt does not, like being able to cut/paste colored text and being able to direct output to a file or a device. However, TSnip lacks features that SnipIt supports like being able to insert a prestring before each line of pasted text. If you find being able to perform cut/paste text operations between any two programs indispensable, now you have two programs from which to choose.

GPrint: by Peter Cherna (Fish 179; Shareware: $10)
A complex graphics utility for printing two-color IFF pictures on Epson FX-compatible printers. Four densities are supported, including the maximum of 240 × 216. (Are you are amazed at the results obtained by using *PageStream* on an Epson FX printer? *PageStream* uses the same graphics mode as this program.)
Other features include two different smoothing options for improved print quality in the lower density settings, left offset of image centering, image inversion, wide-carriage support and suppression of reverse feeds (if your printer can't support them).

Jed: by Dan Burris (Fish 180; Shareware: $7)
Jed is yet another text editor. This Intuition-based editor sports such features as auto-indentation, creation of backup files, word wrap, simple macros, multiple buffers with optional split windows, NewCLI menu option, Help key support plus a few gadgets. The Amiga community may not really need another text editor, but this gives programmers coming from other environments yet another option. **CAUTION:** My error handler (GOMF 3.0) reports that this program constantly attempts to trash the low area of system memory.

TrekTrivia: by George Broussard (Fish 180; Shareware: $3)
If you're a dedicated Trekkie, TrekTrivia lets you measure your level of devotion (or should I say number of hours you've wasted watching TV?) to the original *Star Trek* series. The object of this trivia game is to keep playing as long as possible, collecting Quatloos for every correct answer, and losing Quatloos for each incorrect answer. When you've run out of Quatloos, the game is over.
All the answers are multiple choice, and all input is via the mouse. A cute animation at the bottom of the screen and decent graphics throughout add a nice touch to the game. Once you get bored with the 100 questions, the author sells expansion disks for the game (for only $4 each!).
For a more cerebral *Star Trek* adventure than Eric Gustafson's amazing graphical Star Trek game, try this one. **CAUTION:** My error handler reports that this program attempts to trash the low area of system memory when it loads.

AMC: by Foster Hall (Fish 182; Shareware: amount not specified)
A different type of banner program. While this program creates scrolling lines of text (from right to left, as opposed to the program Startle that scrolls from bottom to top), what's unique about it is that it creates an executable program instead of just asking for an input text file (which really may not make much difference in practice). Scrolling is *very* smooth since the program is written in assembly, however the user has *no* options to choose from besides the text file itself (unlike in Startle).

HR136: by Dick Bourne
(Fish 182: Shareware: $1)

If you are at all interested in using dithering techniques to simulate extra colors while using your favorite paint program, you *need* these special IFF pictures! Included are three IFF pictures that clearly show *all* 136 possible dithering combinations on a 16-color 640 × 400 Amiga screen.

The three screens included show all the dithering combinations for a 16-level grey-scale palette, the default *Deluxe-Paint* palette, as well as a palette created by the author especially for dithering use. While this is nice enough in itself, by simply swapping palettes in *DeluxePaint* you can easily adapt these screens for dithering use with your favorite palettes, and more importantly (via using a spare screen) using dithering techniques in a picture or graphic on which you are currently working.

DPS: by Foster Hall
(Fish 182; Shareware: $15)

If you would rather not bother with IFF ILBM display programs, here's an alternative. DPS, short for Dynamic Picture Show, will input any IFF ILBM file and save it as a fully executable file. You must send in the Shareware fee to use the program, since the demo version will not perform the save function.

One confusing thing about this program was that the author didn't explain how to exit from the sample executable IFF ILBM file. (I don't know about you, but to me having to press both mouse buttons at once to exit the sample file is not very obvious!)

Cards'O'Rama: by Werther Pirani
(Fish 186)

A simple card game to test your memory. You can attempt to match the 16 different pairs of cards against a human opponent, or if you're really desperate, you can try to out-memorize the Amiga (there are various difficulty settings for this contest that at least give you a slim chance). There are a few more menu options, including the ability to peek at the cards (unfortunately when playing against the computer this move can be more beneficial to the Amiga than to you).

QT2: by Charlie Gibbs (Fish 186)

While a talking clock might not impress you that much, QT2 talks like humans do instead of just spitting out numbers. For example, QT2 might say it is "five past seven."

BootIntro: by Roger Fischlin (Fish 188)

This program allows you to create a simple custom boot block that will display scrolling text on a simple yet somehow familiar colorful background. Although the program itself is nice, user groups and commercial programmers may not want to use it simply because such a custom boot block could make it seem like your organization is somehow associated with the pirating community. CAUTION: My error handler reports that this program attempts to trash the low area of system memory.

DiffDir: by Mark Rinfret (Fish 188)

If you have two directories with identical files and you want to make sure which files are truly identical, DiffDir is a very comprehensive comparison program. Not only will DiffDir compare filenames (and directory names), it will also compare file sizes, creation dates, filenotes (remember those?) and protection bits. Case sensitivity is available if you need it.

KeyMapEd: by Tim Friest (Fish 188)

An editor created solely to alter the standard keymaps provided on the Workbench disk. One use for this program would be to alter the Dvorak (usa2) keymap to a more uncommon configuration for those who want the most often-used letters located close to (or on) the home row.

HackLite: by John Toebes and Alan Beale
(AmigaZone file #16130)

Yet another version of the now classic Amiga fantasy role-playing (FRP) game Hack. This version should actually be considered an update to the original Amiga Hack game (originally reviewed in the January '88 installment of this column), since this version is by the same authors.

While all the updates between the original version and this version were mainly bug fixes and/or graphics improvements, HackLite sports new features for the game itself. By far the biggest change is that it is much easier to play.

For those (like myself) who felt that Hack was too sadistic a game, HackLite's challenge level is much more reasonable. There is a new Pray command that gives you help from the gods (maybe!) if you're in trouble, but the major relief is in the form of an "Immortal" mode. As some Hack doubters might expect, Hack's Immortal mode is really nothing of the kind, since it just gives you a fighting chance. Between Pray and Immortal mode however, HackLite is now actually fun to play for non-masochists!

Other new features include fountains (the same ones as in NetHack, but of a more beneficial nature), new monsters (including multiple types of Keystone Kops) and new magic items. While I still find Moria much more enjoyable overall, HackLite is an FRP game I don't mind playing now.

VirusX version 3.2: by Steve Tibbett
(AmigaZone file #16114)

Version 3.2 of *the* best virus detection/elimination program (public domain or commercial) is now available. (VirusX was last discussed in the May '88 installment of this column.)

There is good news and bad news on the Amiga virus front. The good news is that no new non-boot block viruses like the IRQ virus have shown up in the Amiga community. The bad news is that version 3.2 of VirusX checks for *eight* new viruses, doubling the current total of known viruses to 16. Some of the new viruses are rather benign and aren't worth losing any sleep over, but others are a major problem.

The worst new virus in this group is the Lamer Exterminator (no, I'm not going to explain what that means, since I'm not interested in promoting software piracy). This virus isn't that tough to stop (compared to the IRQ virus at least), but for those who aren't guarding against viruses, the Lamer Exterminator can really wreak havoc on your software.

Once this virus gets installed in memory, it will attempt to find any DATA block (meaning that FFS storage devices aren't threatened much by this virus) and trash the block by writing the word *"LAMER!"* all over it. This means that any disk file can immediately be ruined beyond repair (and if you didn't back up the file, kiss it goodbye!).

Unlike the IRQ virus, the Lamer Exterminator randomly chooses which DATA block to trash, so there is no one file or place on the disk to check first.

This virus encrypts itself, making it impossible to catch it just by looking at the boot block with an ASCII boot block viewing program. (It even changes the encryption each time so that you can't try to look for certain patterns in the boot block.)

The only other virus that can cause real problems in this new batch is one called DiskDoktor. The only thing special about

this virus is that it gobbles up 50K of memory every fifth time you boot the Amiga. Needless to say, when you find that your total free memory upon initial bootup is shrinking you'll know something is wrong!

As far as other improvements to VirusX, Steve has added a CHECK option that makes it easy to use in the startup-sequences of a disk where the user really doesn't want the VirusX window hanging around forever, making it easier for Amiga developers to use VirusX on their disk's startup-sequences. (Needless to say, I wouldn't recommend using this on your system disk, since VirusX can only protect you completely when it is running every time you insert a new floppy disk into your system.)

One final note, Steve is now using the C source code for the complete virus documentation, which cuts down on the information overload for new users of VirusX. However, if you want to read *everything* Steve has to say about each new virus as it appears, remember to check the C source in addition to the standard documentation file.

As I finish this column, Fred has released Fish disks 195 to 200, so I will get to those in my next column. As for programs on PeopleLink, I'll be reviewing a new Star Trek game (which is vastly different than Eric Gustafson's audio/visual intensive game), plus much more.

As always, I can be reached on the AmigaZone on PeopleLink (ID: G KINSEY), or on the IDCMP BBS (617) 769-3172 (300/1200/2400 baud, 105 MB online, running 24 hours a day), addressed to sysop. If you have written a public domain/shareware/freely distributable program, or have obtained one that you think is worth mentioning to all Amiga owners, please attempt to contact me via the above, or through *Commodore Magazine.* See you next month.

Fish disks: *For a catalog, send a SASE and four loose stamps or $1 to: Fred Fish, 1346 W. 10th Place, Tempe, AZ 85281.*

To sign up to PeopleLink and their AmigaZone, call them at: (800) 524-0100 (voice) or (800) 826-8855 (via modem).

For information on obtaining the programs mentioned in this column please write to SMAUG at the address below (mention the name of the program and/or send $2 for an Amiga PD catalog disk). SMAUG, 1015 S. Quincy Ave., #112, Quincy, MA 02169. ■

Continued from page 14

is full-sized and nicely animated, decked out in a fashionable jumpsuit (deep space black with green trim) and pulse rifle. Information at the bottom of the screen includes health status, weapon energy and countdown timer. A small text area displays your inventory, game prompts, character dialogue and messages.

Many corridors and rooms are clearly labeled, but the maps are by no means complete—there is much exploration to be done.

Maps of the *Prometheus*' four levels are provided in the command summary card. Many corridors and rooms are clearly labeled, but the maps are by no means complete—there is much exploration to be done. Players advance through the ship one screen at a time, loaded individually from disk. Although disk access is extensive, the lull is reasonably short and doesn't affect the flow of the game.

Generally, play screens are of two types: corridors and rooms. Corridors offer a straight side view of the action, often enhanced by scrolling scenery. Rooms, on the other hand, feature a stylized three-quarter perspective and spectacular 3D imagery.

Eight-way joystick movement allows players to easily interact with the environment—explore hidden rooms, examine evidence, manipulate objects and encounter life-threatening dangers. All in a day's work, sure, but you've only got two hours.

As players interact with the surroundings, clues to survival are revealed. When the character approaches an active screen element, a prompt appears asking for a decision. "Open door?" or "Take new laser?" for example. Simply press the joystick button to execute the current command. Otherwise, pressing the button fires your laser gun. Preserve its energy and quickly find more—you'll need it.

The command card advises players to examine all dead bodies, "even the bloody, torn up, mangled, disgusting gross ones." They aren't kidding. Players stumble upon the first corpse within the first few minutes—a hapless crew member lying face down outside a Level 2 elevator shaft. With a sudden jolt, the music swells as the "camera" zooms in for the kill: The word *DANGER*, written on the wall in blood, serves as a warning. Say, didn't you leave something in your spaceship, like your stomach?

Step gingerly around this unfortunate soul and prepare for carnage beyond anything you've seen in a computer game. Exploded heads, severed limbs, dismembered torsos. To their credit, the designers don't mess around. It's all here in oozing color, if you can take it.

Without sparking a debate on the entertainment value of video game violence, I believe most people smart enough to play this game are smart enough to distinguish between make believe and real life. A software warning sticker is probably in order here, rating the game "R" for its graphic violence. It would not only alert concerned parents, but boost sales of the product as well.

Project Firestart moves with pulse-pounding excitement from start to finish. Obviously inspired by the movie *Alien,* the game features a brutal combination of problem-solving skills and intense action.

Up to two weapons can be carried at one time. Press the "C" key to change weapons before your current laser runs out in the heat of battle. It takes only one misfire to seal your fate.

Other keyboard commands include "I" for listing your inventory, "P" to pause/unpause the game, and "D" to access various disk options (format, save, load and restart).

Use the maps provided to navigate the complex corridors of the ship. Some areas are accessible only by remote elevators. The more difficult an area is to penetrate, the more like it contains important clues, weapons or controls.

The game's movie motif is served well, using such cinematic effects as first-person close-ups, camera tracking and periodic fades to action taking place elsewhere on the ship. Music is also used to create tension. Encounter mutants and the soundtrack shifts into overdrive, which in turn triggers an adrenaline rush in the player. No matter how often it happens, the thrill remains intense. Blast the buggers with your laser and watch them explode into a pile of black and green goo. Disgusting, but well designed.

There are many possible endings to the game, but only one of them is 100 percent correct. This adds even greater longevity to the game's freeform play structure.

Interactive graphic adventures come and go, but few exhibit the style and atmosphere of *Project Firestart.* Turn out the lights, sit back and prepare for a frightfully good time. ■

So tell me, how many times do you visit the arcade in the nearest mall in a given week? Really!? Come on, tell the truth. How many quarters do you really drop into those arcade games? OK, that's more like it. If you're like me, you probably spend $10, maybe more, in an arcade every week.

I like to go to the arcade in the nearby mall on a Sunday about 1:00 or 2:00 in the afternoon when it isn't too crowded. Sundays are mostly do-nothing days anyway. Sometimes when I'm really desperate, I escape during lunch to one of two arcades that are ten minutes away from where I work. I've always had trouble using my "lunch money" for what it was intended.

Anyway, if you're like me, you've probably spent some of your time with an arcade game made by Data East. This company has created some of the biggest titles currently in the arcade and has started to move into new directions with their home computer software line. Because of these new developments, I thought it would be a good time to talk to the folks at Data East to find out what all the fuss was about.

The Players

Recently, I was able to talk to Jim Whims, Mark Beaumont and Connie Freeman of the San Jose-based Data East USA, Inc., and I've corresponded with Robert Lloyd, chairman of the company. This article is a result of all the interesting things they told me about Data East's present and future. But first a little background.

Jim Whims is the executive vice-president and general manager of the consumer division, and he brings experience from Imagic (remember them?) and more. More recently he was with Worlds of Wonder, manufacturers of Teddy Ruxpin and Lazer Tag.

Mark Beaumont is Data East's vice-president, marketing and development. Before coming to Data East he was with Mediagenic from their start in the Atari 2600 days. Before Mediagenic, he worked with Atari during the same 2600 craze.

Connie Freeman, Data East USA's marketing director, is responsible for putting together the current promotional campaign for Data East's MVP Sports line, as well as all the rest of Data East's marketing.

Finally, Robert Lloyd is chairman of the board and president of Data East USA, Inc. He has been with the company since 1981; his previous experience includes positions at Fila Sports, Inc. (an Italian sporting goods company), Spalding Sporting Goods and General Electric Corporation.

You might wonder why I'm telling you about these people, since all you're concerned about is whether the Data East games you boot on your computer will be any good or not. Well, my friends, these people are responsible for making those games good, even great, and they (along with the other 51 professionals who work at the firm's headquarters), have built a company that produces only quality products. In particular, these people are trying to make sure that you are happy with what you buy from them. After listening to their plans and examining their past successes, I have great expectations for Data East.

The company has already proven themselves a contender in the market. It's up to you to decide whether what they do next is "any good" or not. Give them a listen . . .

From Arcades to Video Games to Pinball to Computers

Data East USA, Inc. began operations in 1979. The company started out in the arcades with strong hits and now has as many as 20 machines in the arcades at any given time. Since 1979, Data East has expanded from a company worth $1 million to a $70 million coin-op and home entertainment giant. Data East is a subsidiary of the Japanese company Data East Corporation, but that didn't stop them from adding a subsidiary of their own. Data East Pinball was formed in 1986 and its first machine, *Laser Wars,* did well in the arcade. More pinball machines are scheduled to be released later this year indicating a strong future for the company in this area.

Data East has some other innovative achievements to boast about as well. The company pioneered the idea of conversion kits for arcade machines with their Deco-Cassette system. To switch an arcade machine to a new game using the same cabinet, you just switch a cassette with the game information on it in the back of the machine and change the game's title marquee and instruction panel. In my experience, this is the easiest way to convert one game to another. With standard conversion kits have you change chips and circuit boards, introducing the possibility of error.

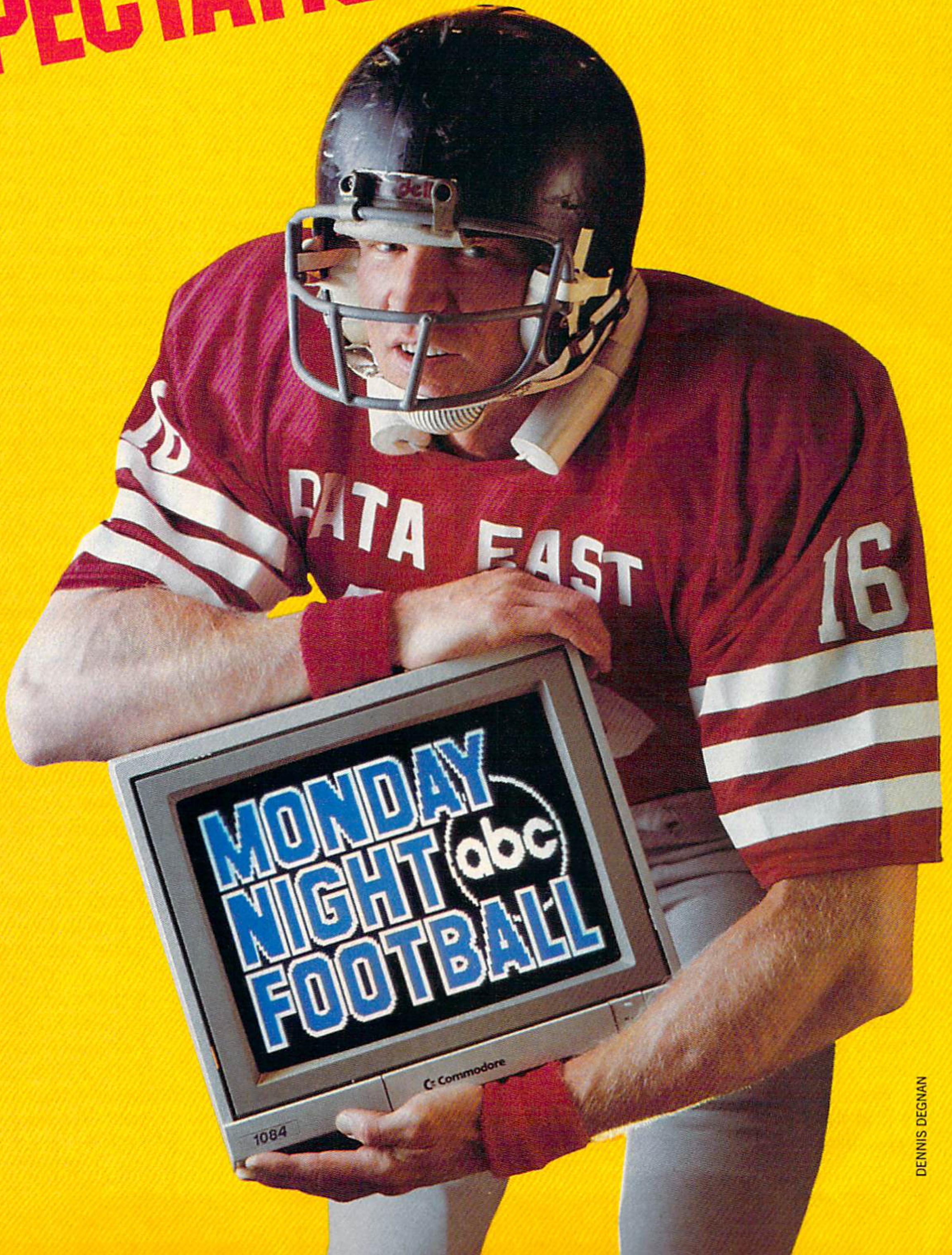
Another point of pride at the company is that Data East is the only company to participate in each of the four major gaming market sectors: pinball machines, arcade games, home video games and computer software. No other company has a presence in such a wide variety of industries, and certainly none have yet expanded into more than one of these sectors as successfully as Data East. Their attempts are as good an indicator as any that the company is here for the duration.

The consumer division of Data East, half of which (the computer software side) we are really concerned with, was initiated in 1985. Noteably, this division takes credit for Data East being the first third-party licensee for the Nintendo Entertainment System (NES). More importantly, the consumer division's first computer product, *Karate Champ,* has reached the Software Publishers Association's "Diamond" status (500,000 units sold)—a milestone that no other software program has ever seen. With a track record like this, it's no wonder Data East wants to branch into other areas of computer software.

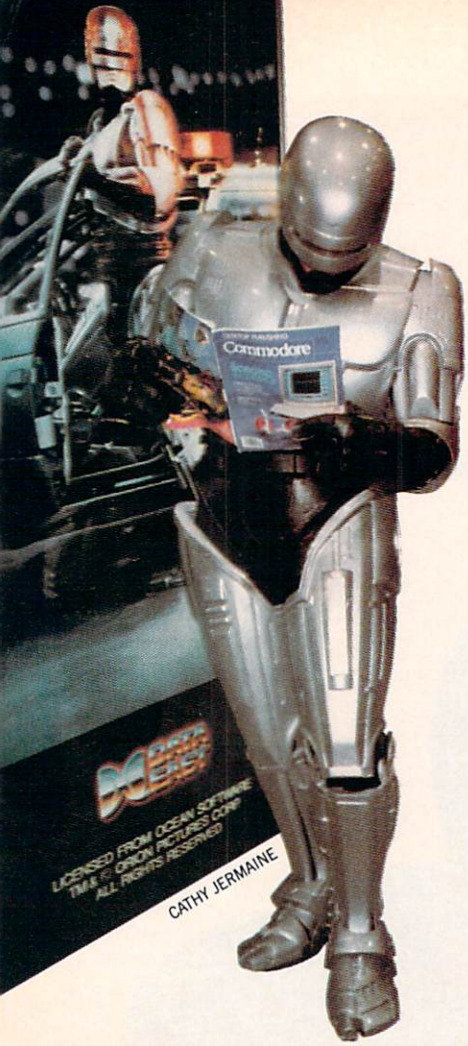
Data East's first move into the consumer arena of software and video games were really with the NES. Whims explained that Worlds of Wonder had the distribution rights to the NES, and when he left that company, he was able to secure the rights as a third-party licensee for his new

DATA EAST'S GREAT EXPECTATIONS

by Russ Ceccola



DENNIS DEGNAN



CATHY JERMAINE

employer. Watching the NES carefully, Whims realized that the consumer division of Data East could grow right along with Nintendo.

According to Whims, "We try to do work closely with Nintendo and look where they've been successful in the marketplace and try to emulate a lot of what they've done. In addition, if a game does well in the arcades, we already know that it has got the broad interest, the equity with other hits and, most importantly, the title awareness. We then take those games and port them over to both the NES and computer software." This strategy has worked very well for Data East and will most definitely project them into the future.

Mark Beaumont's experience in the industry brought yet another insight to Data East. He was with Atari from "National *Pac-Man* Day" (what a concept!) all the way through the cartridge failure of *E.T.* While employed by the home video game pioneer, Beaumont had "the opportunity to see how not to manage a business. It let me see the business overheat."

Fortunately for Mark, he was able to join Mediagenic (then called Activision) when they began as an Atari 2600 cartridge company. While there, he "evolved into the computer software business along with Activision because when I started there, they weren't doing any software, only [video game] cartridges. Probably the most important thing that I saw there was that as Mediagenic diversified into different categories, it showed me that there were other viable markets within entertainment software. [At Data East] we intend to be a full-service entertainment company within computer software, which is almost a microcosm of our global company stature of being in all entertainment categories in the video game business."

So there you have it folks—the key to success for Data East's computer software business. Their strategy is three-fold: build slowly and carefully like Nintendo and follow their example; market familiar titles from the arcades and the popular media like TV, music and movies; and branch into other areas of computer software (besides arcade-style games) as well. If Data East follows through, we may just have another Mediagenic or Electronic Arts on our hands. Only time will tell.

In the meanwhile, you've got a lot to look at as far as home computer software goes. Although only two of the games that were available at press time (in early June) are original titles developed for the home market *(Batman: The Caped Crusader* and *Platoon*), you have a lot of good stuff to choose from. If you want to while away the time playing a solid arcade hit, these Data East titles are for you.

As Whims stated, "I believe that gaming is a true form of entertainment and it's been around forever. Just like movies and records and TV and everything else, people choose time for playing games."

Like the man said, we all love games. The lineup of Data East computer software for the Commodore 64 includes the all-time classics *Karate Champ, Kung-Fu Master* and *Commando,* as well as recent hits like *Kid Niki, Ikari Warriors, Victory Road* and *Robocop*. I have found all of the 17 games currently available for the Commodore 64 to be very easy to play, but difficult to master. (I know you've heard that time and time again, but in this case it is true.) The graphics in all of the games I've seen so far have duplicated the arcade screens as closely as possible. The sounds are the same and the feel of the games are the same. This is important in any arcade translation.

Whims explained Data East's strategy in operating as a game company and designing these translations: "We've structured ourselves with a very lean philosophy because in the game industry, some years you have great games and some years you don't. We're probably the only company in the industry that has never had to lay anybody off and has never had any problems like that at all. We are structured so that if we have a lean year, we're still making profits. When we have a great year, everyone has a great year." He went on to say, "You have to understand that we look at ourselves as being a true game company. Ultimately, we use the arcades as a test market for the home games. We tend to manage our programmers a little more tightly than most others, which has led us to be a little more successful in getting things done on time."

Picking a Winner

That explains the quality of the games, but how do they decide which games make it to the arcade and/or to the home market? Data East uses some research techniques that are unique in the industry, and that can really help them in choosing games. In particular, they have recently hired Steve DiFrisco, who worked as a programmer for Nolan Bushnell and was an employee of Imagic. He has done a lot of programming and game development and has managed groups of programmers. Whims explained, "What Steve does for us both in the arcades and in the computer software business is spend a lot of time with the kids, with the customers in the marketplace and in the arcades trying to keep us as close to the market as possible." Sounds like a dream job, doesn't it?

In addition to using Steve's insights into the games and the market, Data East also does a lot of traditional market research—surveys, questionnaires and focus groups. All the research that the company has done pays off every time someone puts a quarter into a hit game or buys a software product or video game. In addition, to try to stay as current and youth-oriented as possible, Data East is even considering implementing a kids' board of directors!

Branching Out

Now that we know Data East's strategy for the development of successful games, let's talk about some of the more recent attempts to branch into other areas. With the release of *Q*Bert* and *TNK III,* Data East tried to start a budget line of software called the Moving Target Series. However the series has been put on hold until the company is in a stronger position to devote time to the project. In order to do

that, Whims mentioned that they had to get the quality of the translations up to par before they could even think about a budget line. If you can find *Q*Bert* or *TNK III*, pick them up. Just like the other translations, they capture the essence of the original games, as well as the graphics and sounds.

Data East is also breaking into the Amiga software market. *Platoon* was the first game from Data East to be offered to the owners of what I like to claim is the best game machine around. Ironically, this first Amiga game was an original idea for the home market and not an arcade game translation. Still, the Amiga version is great and far surpasses the Commodore 64 version. *Platoon* takes full advantage of the capabilities of the Amiga and blows you away with the graphics and sounds that come from your monitor. If this is any indication of the future, I can't wait to see some of the arcade translations for the Amiga.

That brings us up to date as far as what Data East has done so far. What they plan for the fall is even better. By the time you read this, you may have already heard about the sports line of software and possibly even some other announcements as Data East prepares to enter new categories of software. Now let's look at how Whims, Beaumont, Freeman and Lloyd see the future of Data East and reveal as much of their plans as possible.

MVP Sports: The Return of Scott Orr

The biggest project on Data East's horizon is the MVP Sports line announced at the Consumer Electronics Show in Chicago during the first week of June. Scott Orr, founder of the sports-oriented publisher Gamestar (of *Star Rank Boxing* and *Take Down* fame), is the other half of the design team of the MVP Sports line. After leaving Gamestar, Orr formed his own company (Season Ticket Productions), and his work with Data East is his first project independent of Gamestar. Bob Lloyd mentioned that Orr and Beaumont are working closely on the development and product positioning end.

The first game to be released in the MVP Sports line is *ABC Monday Night Football*. Lloyd claims that all of the MVP Sports titles will be "easy to learn, but difficult to master." There's that phrase again! If past attempts at bringing that phrase to life in a game can be used as examples, I expect the MVP Sports line to be a great new series of games. Besides *ABC Monday Night Football*, other planned releases include a baseball game, a basketball game and a racing game that ties in to Al Unser, Jr., tentatively titled "Unser Turbo Racing." These games will initially be available for PC-compatibles and the Commodore 64.

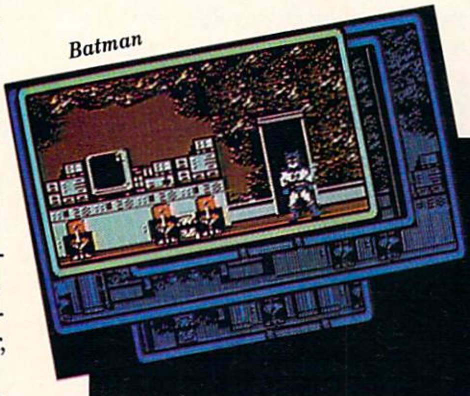
Data East is being very secretive about upcoming games. It was tough to get the information that I did out of them. They had to be careful about what they said for fear of the competition stealing their ideas. That's a very cautious approach which will probably save them a lot of gray hairs in the long run. It also indicates to me that the games will be something special—the things people keep the lid on the most are usually the most successful.

Whims wants to make sure that the new line of sports titles is worthy of the Data East name. He confided, "This is our first launch into a new category. We want to make sure that we do it right. So we're going to spend the time and money to make sure that we do it properly. It's real important to us because we really want to be a broad-based entertainment software company in this industry."

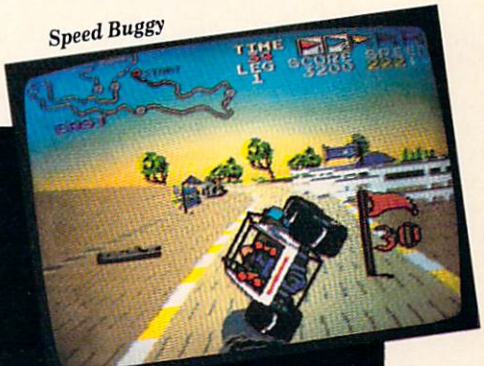
In addition, Connie Freeman hinted at a super promotional campaign that will really bring the games into the eyes of the public, "In addition to our commitment to expansion into the different software arenas, we will combine a consumer product promotion in the form of a contest or sweepstakes with our efforts. I think that it's going to be pretty exciting both from a consumer and a retail standpoint because of how we'll be presenting these games to the market." By the time you read this, the promotion will have been launched (See News on page 6 for late-breaking details).

In addition to the MVP Sports line, Data East hopes to expand into other product categories in the coming months. In particular, fantasy role-playing games and simulations are the categories that were hinted at by everyone I talked to. If Data East's MVP Sports line is successful, people will recognize that they do more than just arcade games. By venturing into other areas, they will really turn into the broad-based publisher they aspire to being. I look forward to their efforts in this direction.

Continued on page 88



Batman



Speed Buggy



Kid Niki



Platoon



ABC Monday Night Football

Mickey Mouse had his sixtieth birthday last year and celebrated it in grand style—by getting into big trouble. Yes, the world's most famous rodent made the mistake of dabbling in magic using the sorcerer's magic hat. You remember how much trouble it caused last time when he tried it on in *Fantasia* and flooded the whole castle, don't you? Well, this time, the sorcerer decided to teach Mickey a lesson by casting a spell so no one would recognized him. Poor Mickey . . . it's hard to go from being a star to being a nobody. It looked like the hosts of his birthday party, Cheech Marin and Felicia Rashad were going to have to pass out cake and ice cream without him when Mickey showed up. Cheech didn't recognize him, due to the sorcerer's spell. Happily, the sorcerer decided that Mickey had learned his lesson; he removed the hex and Mickey and the whole Disneyland gang celebrated his birthday with gusto.

As the crew from *Who Framed Roger Rabbit* can tell you, creating scenes where real live actors interact with drawn animations, or "'toons," is the toughest job an animator ever faces. But the sequence where Mickey talks to Cheech and dances with the young Disney-ites wasn't animated by a hard-driven crew of Disney animators worked into the ground by the Big Bad Wolf wielding a whip. Hardly! Ex-Disney animator Heidi Turnipseed drew this scene on an Amiga computer in the serenity of her sylvan Ojai, California home high above glistening Lake Casitas and far from the smoggy gridlock of L.A.

Director Sam Cornell was pleasantly surprised when Heidi showed up at the Disney television studios with a finished line-drawn animation on videotape of Mickey dancing in animated glee with Cheech and Felicia. Disney normally shoots this series of line drawings, called a "pencil test," for the director's motion approval on an $8000 Lyon/Lamb stop-action video controller.

While the director was surprised to see Heidi show up with a finished video pencil test, he was astounded to hear the sound coming off the tape in perfect synchronization. The expensive pencil test system used at Disney just can't do that! Says Heidi, "He wanted to know how I synced the sound to my rough drawings, but when I started to explain about the computer, the digitizer and the software, he just looked at me like I was a Martian!"

Heidi Turnipseed . . . Turnipseed? "Yes, it's my real name by marriage," she says of her curious name which sounds like a character from a Beatrix Potter novel. While you may not know Heidi by her storybook name, you've probably marveled at her work on Disney classics like *Robin Hood, Winnie the Pooh and Tigger Too, The Rescuers* and *The Fox and the Hound.* But Heidi stamped her name firmly in animation history with her work on the Don Bluth production of *Secret of NIMH,* which became the top-grossing first release animated film of all time; the ground-breaking video arcade game *Dragon's Lair* and the legendary Stephen Spielberg production *An American Tail.*

The talented Turnipseed is one of a very rare breed; fewer than 50 animators are alive and working today who've earned the prestigious title of full Disney Animator. Before she discovered the Amiga, studio animation was the only career she had ever known. When Don Bluth Productions moved to Ireland in 1986, Heidi stayed wistfully behind to face an uncertain future, only to find that she didn't need a production studio anymore.

Under the watchful eyes of her kitty named Punkin, two horses, three affectionate dogs and an adoring husband, Heidi Turnipseed works at her California woodland home with pencil, paper and an Amiga computer. Three years ago, Heidi knew nothing about computers; now she supports herself completely using a hard-working Amiga 2000.

The Traditional Classical Animation of Walt Disney

Mickey was 60 years old last year, although he doesn't look his age, and the world watched as this famous phantasm of painted celluloid frolicked through the sets of *Family Ties, Cheers* and Disneyland's Main Street. We could see Mickey, we could hear him, he was real . . . a star among Hollywood stars, dancing his way into the hearts of the world with effortless ease. When Mickey's enchanted hour of illusion ended, we sat spellbound as a bulging list of animation credits rolled endlessly by. The Disney television special was months in the making and employed the nimble fingers of a host of artists.

It takes an animation army to produce a Disney feature, and there are rigid ranks within that fantasy army, with the animator as general, second in command to the four star director.

The Disney animator creates the character's personality and humor in rough drawings that describe the action, called the "extremes." Film needs a minimum of 12 drawings per second, but the animator

HEIDI TURNIPSEED
THE AMIGA'S DISNEY ANIMATOR

by Ben and Jean Means



AL COLLETT

will only draw between two and eight drawings per second. So the studio uses an inbetweener and a breakdown artist, called "followup artists" because they follow up the animator, to bridge the gaps between the animator's drawings. A breakdown artist does the an intermediate drawing, called the "breakdown drawing," in between the animator's extremes. Finally, the inbetween artist draws the remaining drawings, called "inbetweens," for visual smoothing.

At Disney, an artist moves up the ranks slowly from inbetweener to break down artist and finally to assistant animator. An assistant animator can do one or all of a number of things; Heidi explains, "You're kind of an assistant and a gopher and an inbetweener; by then, you have more responsibility and you're expected to know more about the process and help expedite the animator's work. That's how you learn everything that an animator has to think about and everything that they're exposed to. When you're an inbetweener, you just sit at your desk and do inbetweens; when you're a breakdown artist, you pretty much just sit at your desk

and do breakdown drawings, but you're in charge of supervising the inbetweeners and making sure they do their drawings correctly after you've done yours. When you become an assistant animator, you wait on the animator—that's really what it is."

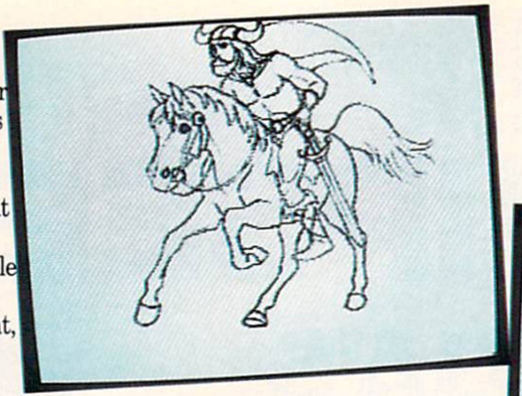
Heidi could not do classical Disney-style animation at home without her Amiga; she says, "I couldn't afford the equipment, and the traditional animation process takes too long. First, the animator does the main line drawings to show the extremes of the character's movement, and then shoots a pose test on video where you see the character jump from extreme to extreme. If the pose, or pencil test looks good to the director, the breakdown artists and inbetweeners will draw the frames in between the animator's drawings and shoot another pencil test to make sure the scene still looks good. If it does, an assistant animator does the final cleanup up on the whole stack of drawings.

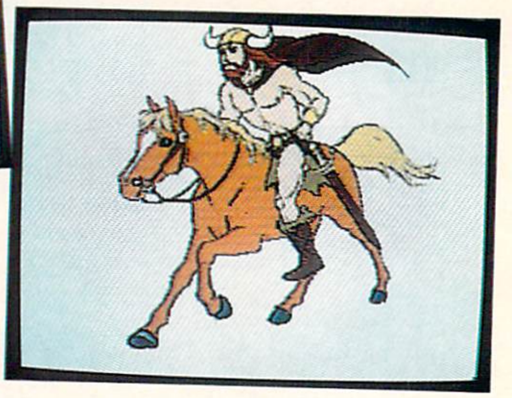
"Then the Xerox lab shoots the drawings onto transparent celluloid, (hence, the name *cel animation*). But the peg holes on the Xerox cels never line up 100% with the original drawing; so a Xerox checker—usually some poor fledgling trying to break into the business—has the tedious task of correcting the registration. The Xerox checker lines up the pencil drawing with each Xerox cel, repunches the holes in the Xerox cel and adds stick-ons so the cels won't move. Then the cels go down to the paint department for careful hand painting by cel painters. The camera department composites the hand-painted cels over the backgrounds, hand painted by scenery artists, and finally lays the scene to film, one frame at a time."

Classical animation is a Herculean process, with a vast cost involved. Heidi says, "Without the Amiga, independent animation would be out of the question. There's no way I could do it." She adds, "I don't own a $100,000 Oxbury animation camera, I don't own a Xerox lab that puts Xerox lines on celluloid, and I don't own a paint lab that has all the different colors of vinyl cel paint." But Heidi has handily replaced all this expensive gear for a few thousand dollars with an 8mm camcorder, a digitizer, a genlock, a few pieces of software and an Amiga 2000.

Breaking Away

"With the Amiga, I no longer have to work for a studio," Heidi beams. "And for the first time in my career, I've been able to see my work all the way through to the final color animation. For the first 15 years of my career when I finished my line drawings, an animation supervisor took them out of my hands, and I didn't see the scene again until the movie was finished. Now, I paint my own background, color my own animation and play it back in color for myself. So this tickles me; I now have complete creative control."





Lights, Camera, Amiga—At Home in the Studio with Heidi

Heidi still begins her animation with the same classical techniques that the top Disney animators, known as the "Nine Old Men," used to create *Fantasia, Cinderella* and *Pinnochio* during the '40's and '50's. She sketches a rough line drawing of the character in pencil on thin onionskin paper mounted on a circular holder, called a "pegboard" in the industry parlance. Each sheet of onionskin has holes punched in it so that each drawing will line up perfectly with the rest when set onto the pegs. The paper rests on a glass plate in the animation stand with fluorescent lights underneath so that she can see through several sheets of paper at once.

In this time-honored way, Heidi checks movement by interlacing several sheets of paper between the fingers of her non-drawing hand and then rolling them upwards to flip through several drawings. But from this point on, Heidi has left the familiar ground of traditional animation for an uncharted realm of animation possibility with her Commodore Amiga.

The pegboard disk goes in a special holder under an RCA TC2512 camera mounted on a professional copy stand with three 75 watt and one 100 watt soft white bulbs for lighting. Heidi then shoots the drawing frame by frame into the Amiga with NewTek's Digi-View. Heidi perfected this unusual Digi-View setup after much experimentation; she says, "At first, I had to do a lot of touchup. I found I needed a camera with switchable Automatic Gain Control (AGC), so I could switch it off when I just needed a clear black line and wasn't looking for shades of grey. Plus the new edge detection routine in Digi-View 3.0 helps."

Now the Amiga begins to shine in all its glowing 4096 colors: it completely eliminates the need for Xerox checking! Says Heidi, thrilled, "Once the drawing is digitized into the Amiga, the registration is perfect. It doesn't jiggle or get off registration; it's ready for painting.

"In traditional animation, when you would Xerox drawings under the transparent celluloid, the pegs were never accurate; the studio had to pay someone to sit through the tedium of Xerox checking. Because the Amiga shoots everything on the same camera and with the same registration pegs, I can shoot something weeks later, and it will still be registered when I call it up. Once I've shot my animation into the computer, it's registered, I paint it, it never moves, it's perfect!"

But it is the Amiga's breakthrough ability to shoot a pencil test which has banished the technical spell that bound animators to the marriage of time clocks, big cities and production studios. A pencil test is the magical formula for checking the visual illusion of an animation while the animation is still in its line-drawn or "pencil" form. A traditional pencil test uses an $8000 Lyon/Lamb video controller to shoot the line drawings frame by frame



"The Amiga makes a big difference; now an animator can have a home pencil test system, instead of having to drive into the studio. Animators don't even know this yet."



onto videotape, so the director can check the action and timing. It's an elaborate process, and videotape is a sequential medium. "With the Lyon/Lamb," glows Heidi, "if I want to change the order of one or two drawings in the middle of an 80-frame sequence, I would have to shoot all 80 frames over again. But with the Amiga's random access memory, I can just call up the order file and arrange the frames in any order I like and play them back right away."

Once Heidi has all her drawings digitized into the Amiga, the real fun of random access memory begins. She simply loads all the drawings into MicroIllusions' *Photon Video: Cel Animator* in order, selects the speed she wants them played at and presses play to begin an endlessly looping pencil test which appears on her computer monitor. This immediate feedback is a far cry from the limitations of the classical animation process.

"It takes a little longer to digitize each picture than it does to just shoot it on the Lyon/Lamb because it takes about 30 seconds to digitize each frame. But once it's in the Amiga, you have all this versatility. For instance, I did an animation of a galloping horse, which I showed on [PBS's] *Computer Chronicles*. Typically, I would have shot this animation on the Lyon/Lamb system, which would lay the output to a videotape machine. Since tape is a sequential medium, I would have to shoot frames one through ten, one through ten, one through ten, one through ten, one through ten. When you play it back, the horse gallops five times, and then you have to reel it back to see it again. But on the Amiga running *Cel Animator*, I only have to digitize those frames into memory one time, and it will play as a loop as long as I want it to.

"So the convenience of this is just terrific; the Lyon/Lamb system costs $8000, and you can set up and have your own pencil test system with the Amiga for under $2000. The testing is a big advantage. I would have had to be working for a studio; there would be no way that I could test my own animation at home without investing $8000 in a Lyon/Lamb system or paying an animation camera service to shoot the animation and develop it on black and white reversal film. I would have to buy a moviola and thread the pencil test up on the moviola just to look at it. This just made it impossible to be anything but someone who was part of a production team in a studio. The Amiga makes a big difference; now an animator can have a home pencil test system, instead of having to drive into the studio. Animators don't even know this yet."

With a stroke of the mouse and a bound of its VLSI, the Amiga combines this perfect registration with quick feedback to create a whole new realm of visual legerdemain. Says Heidi, "On my original pencil test of the galloping horse, I first drew just the horse and next added the rider with no costuming. Then I added the Viking costuming on a third level." Since Heidi saved each version separately, she now has A. a galloping horse, B. a galloping horse with a generic muscular male rider, and C. a Viking riding his animated steed. If at some time she wants a woman or a goblin or a six-foot-tall Pookah named Harvey riding a horse, all she needs to do is draw the new character. Or she can call up her Viking and draw in a unicorn or a dragon or a slizzard as his magical mount. She can even call up her generic galloping rider and turn him into a show jumper in dressage, a Mongolian warrior or a knight of the Round Table.

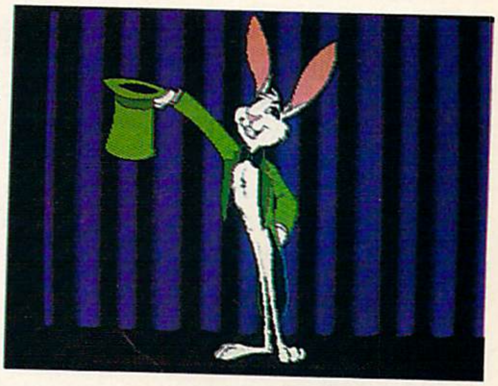
Color!!

Once Heidi is satisfied with the movement of her character in the pencil test, all that remains is to color it in and add scenery. She can color the pencil drawings that are already digitized and doesn't have to do them again, like she did in traditional animation. Although Heidi freely admits that she is more talented at animation than at painting with tools like *Photon Paint* and *DeluxePaint III*, she rarely needs the specialized talents of a scenery artist. And she never has to buy more paint or clean a brush!

Heidi uses another unusual setup for creating the graphic elements of her animation background: her mouse has met its match in the WICO trackball controller. The trackball is her primary drawing tool, and Heidi explains, "The mouse is a very small ball and very small in comparison to your hand, so a slight movement with the mouse makes a very gross movement on the screen. But the ratio is just the opposite on the trackball. You don't have to move your hand all over the desk; you can do something with just the tips of your fingers."

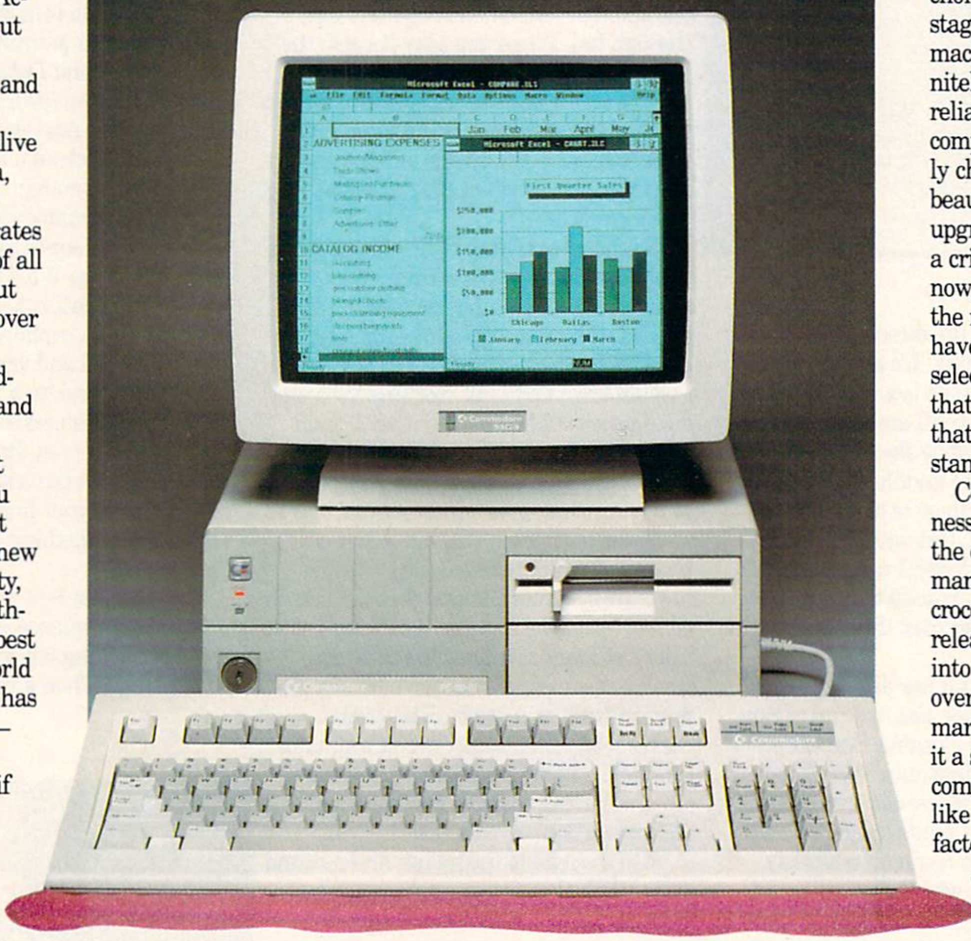
She describes how she created the background in a sequence where a top hat with two feet sticking out of it comes flying onto a stage. Then a hand reaches out

Continued on page 89



A Compromise of Superlatives

by Daniel Grotta



Trying to decide precisely what should be your number one priority when buying a brand-new MS-DOS® compatible computer is a little like asking what part on a parachute is the most important. Is it the ripcord, or perhaps the tether lines? How about the canopy? What if your harness isn't strong enough? No, it must be the way a chute is packed. Actually, if you're about to skydive out of a plane at 5,000 feet and want a hope and a prayer of landing alive back on terra firma, you'll want a parachute that incorporates only the very best of all components, without choosing one item over another.

Ask a dozen hardcore computerists, and they'll all tell you something different about what it is you should look for, first and foremost, in a new computer. Reliability, one would say—without reliability, the best computer in the world is worthless. No, it has to be performance—what good is a dependable machine if it can't do the work you need it for? No, compatibility is the key—an IBM clone is useless unless it can run all my favorite software. But it has to be protection against obsolescence—a machine can end up an expensive, useless technological orphan if the system becomes outmoded. What's most important is the manufacturer—why risk buying a no-name brand when you could obtain one from a company with an excellent industry reputation? The number one consideration is price—what is the value of a computer that has all these goodies if you can't afford to buy it?

And then there are other contenders for the most important considerations in selecting a computer, such as ergonomically and aesthetically sound, small and quiet enough for a good working environment, having a nice tactile keyboard and a high-resolution screen that won't give you eye fatigue, and being expandable enough to accommodate all the popular peripherals and disk drives that you need or want.

By now, it should be fairly obvious that a good computer is the sum of all the above-mentioned parts—and even more. With literally hundreds of IBM clones on the market, with prices ranging from under a thousand bucks to literally tens of thousands, the choice of machines is staggering. The ideal machine would be infinitely powerful, totally reliable, completely compatible, ridiculously cheap, fantastically beautiful and easily upgradable; alas, such a critter doesn't exist now, and may never. In the meanwhile, buyers have to compromise by selecting a computer that most closely meets that theoretical ideal standard.

Commodore Business Machines—one of the oldest and largest manufacturers of microcomputers, recently released its PC40-III into the seemingly overcrowded MS-DOS market. What makes it a standout from its competitors is that, like a luxury car with factory-installed accessories and options as standard equipment, the PC40-III model comes already configured with most of the components, features and software that an AT needs to operate. This is in contrast to most machines that, like a stripped-down sedan in which almost everything is optional and extra, usually cost far more than the basic sticker

price in order to equip it comparably and correctly.

The PC40-III is a handsome, compact-sized well-built AT-compatible that comes equipped with significantly above-average off-the-rack statistics: one megabyte of RAM on the motherboard (which can be expanded to 16 megabytes), a blazingly fast 40 megabyte hard disk drive and a 1.2 megabyte 5.25-inch floppy drive, a built-in high-resolution VGA graphics adapter, a full-sized enhanced 101-key keyboard, parallel, serial and mouse ports, a handy reset button on the side, a battery-backed real-time clock/calendar and, because the high-speed floppy and hard disk drive controller is also built into the motherboard, a total of four empty, available expansion slots (which will accommodate three 16-bit and one eight-bit boards).

Because users have different needs, wants and budgets, the only optional component is a monochrome or color monitor. Commodore currently offers only the Commodore 1403, a mono-chrome monitor excellent for word processing or desktop publishing. However, any other manufacturer's VGA or multisync monitor can be attached.

To make it a self-contained, all-inclusive system, Commodore includes an operating system, MS-DOS 3.3, and GW BASIC, which usually cost extra when purchasing many clones.

Another frequent extra charge often tagged on by either the manufacturer or computer store is "prepping" (preparing) the computer by partitioning and formatting its hard disk and installing the DOS. The PC40-III is prepped right at the factory and is ready to boot right out of the box.

Setting up the PC40-III is refreshingly simple, even for computer illiterates. All one needs do is attach the keyboard (which plugs into a port on the right side of the computer, a more convenient location than the rear port most other machines have), then attach the monitor cable, the power cord and any accessories like a printer, plotter or mouse. Since all the ports are clearly labeled, choosing what cable attaches to which connector is virtually foolproof. Almost as easy to set are the four accessible configuration DIP switches, three of which must be toggled in order to select what type of monitor is attached to the computer (if you have a color VGA monitor you don't have to change anything since that is the factory-set default value). Again, it isn't necessary to read any instructions or run a diagnostics program, since the appropriate settings for other types of monitors are clearly indicated. The fourth, clearly labeled DIP switch tells your computer whether or not you wish to use that extra 384K above DOS's 640K as extended memory (disabling it may be necessary for adding certain types of memory boards).

Once all cables are connected and (if necessary) the appropriate DIP switches thrown—a task that will take, at the outside, ten or so minutes—you're ready to turn on the computer.

Should you wish at any time to make system changes, such as adding a second floppy disk drive or increasing RAM by a couple megabytes, changing the clock to or from Daylight Savings Time or slowing down the computer's speed in order to run certain time-sensitive software, there are two extremely useful spins that Commodore puts on its setup and configuration process.

The first is the ROM-based Commodore Setup Utility, which can be invoked instantly merely by simultaneously pressing the CTRL/ALT/ESC keys. To register an addition, deletion or other change on your system, all you have to do is follow the simple, logical, you-don't-really-need-to-read-any-documentation instructions on the screen.

The second goodie Commodore provides is a unique built-in utility called Autoconfig™ that



Since all the ports are clearly labeled, choosing what cable attaches to which connector is virtually foolproof.

From left to right they are the mouse port, audio out, RGB Video, Serial and Parallel. Between the RGB and Serial ports is a set of 4 DIP switches labeled Config. These switches allow you to "tell" the PC40-III what type of monitor is connected and if you wish to use the 384K of RAM above DOS's 640K.

CHARLES BARTHOLOMEW

automatically prevents hardware conflicts (which can freeze up or even do permanent damage to your computer) that frequently occur whenever a new peripheral or device is first plugged into an expansion slot in your machine—no other IBM-type computer offers this safety feature.

Actually using the PC40-III to write a letter, create a spreadsheet or play a game is no different than using a comparably-equipped IBM, Compaq or almost any other AT-clone. That's because it's 100 percent IBM compatible, and can run without any problem whatever almost any standard software you can think of, from Microsoft *Flight Simulator* to *Lotus 1-2-3, WordPerfect 5.0* to *Ventura Publisher 2.0*. And it does it at above-average speeds, since the PC40-III runs at a relatively moderate 12MHz (or about twice as fast as the original IBM-AT, more than quadruple the IBM-PC's speed), and the hard disk is significantly faster than anything in its class. Because of its clean, classic design, high degree of quality control in manufacturing and the high-quality components used, the PC40-III is a reliable machine that will probably give years of trouble-free service.

There are, of course, various stylistic and engineering differences that distinguish the PC40-III from other clones. For instance, the PC40-III's size and appearance: it has one of the smallest footprints around. For the uninitiated, a footprint is the amount of desktop space that a computer requires. Most AT's and AT-compatibles are large, boxy, cumbersome packing crate-sized units that dominate a desk to the point where there is room for little else. In contrast, the Commodore model is less than half the size of a standard PC, and with four full-sized slots available, it packs almost as much expandability as full-sized AT's. That's because the serial and parallel ports, hard and floppy disk controller and the VGA graphics board are built into the motherboard and not on plug-in peripheral boards.

As might be expected, there are two significant trade-offs for this compactness and completeness. In order to shrink the computer's physical dimensions, the PC40-III is equipped with a very small, quite modest 112-watt power supply instead of the AT's typically beefy 180-to-220 watt power supply. For most users, that's not very important, since 112 watts is more than enough to comfortably power almost any plug-in peripherals on the market. In fact, the smaller power supply means that the PC40-III runs much cooler than most other AT clones, and a lower internal temperature generally means a more reliable, longer-lasting computer.

Downsizing, however, also translates into fewer drive bays; besides one hard disk drive and one 5.25-inch floppy drive, the PC40-III can accommodate only one additional half-height device, such as a 3.5-inch floppy drive, tape streamer, etc. This can be an annoying, but not necessarily insurmountable deficiency for some business users who want and need more than 40 megabytes of disk storage. Though the documentation indicates that one, and only one hard drive can be installed on the system (although you can replace the original 40 megabyte drive with a third-party high density drive having 80, 120 or even more megabytes), what it doesn't say is that it's possible to get around this hardware restriction by plugging in one or more 10-to-80 megabyte hard card drives in the computer's empty expansion slots.

Ergonomically, the PC40-III is a comfortable machine to work with. Being small and light, it's no problem for even a 98-pound weakling to unpack, carry and set it up. Because of its small-sized power supply and correspondingly smaller cooling fan, the PC40-III is an unusually quiet machine, especially for an AT. Its full-sized keyboard is neither firm nor mushy—if you're used to IBM's old Selectric®-style keyboard, with its heavy keys and noisy clicks, then this isn't the keyboard for you—but it has an intermediate tactile touch that should appeal more to occasional users than professional typists.

On the front of the computer are well-placed status lights indicating power on and hard disk access, the 5.25-inch floppy drive and a key-activated lock that keeps prying hands from unauthorized access. On the PC40-III's right side are a reset button (which takes the place of having to push CTRL/ALT/DEL in order to reboot the computer), and the ON/OFF power switch is at the rear.

Opening the case in order to install peripheral boards or add a second floppy disk is an easy matter of removing six screws and sliding the housing off. Since the slots on the motherboard are uncluttered and unobstructed, actually installing or removing boards is remarkably facile. Being 100 percent compatible, any board designed to run in the IBM-AT, XT or PC will work in the PC40-III. As mentioned previously, Commodore's unique Autoconfig feature will greatly assist the user in selecting and setting board DIP switches and jumper pins in order to prevent hardware conflicts.

Like most machines, the PC40-III has a few small quirks worth mentioning. One is the mouse port, a good idea that, in theory, frees up the computer's one serial port or a valuable empty slot that would be otherwise used for a serial or bus mouse. Alas, unlike most other clones with dedicated mouse ports, the PC40-III's works only with Commodore's own mouse, and no other brand.

Another feature that could be appreciated only by an accountant is the keyboard's annoying habit of powering up with the Number Lock engaged. Most users, who type in a command to go to a particular program or load in a specific file after turning the computer on, must first toggle the Number Lock key to the off position.

While the Commodore's VGA monitors offer excellent definition and resolution (640 × 480 in 16 colors or gray tones is standard, and even higher resolutions and more colors are possible), they are also fairly susceptible to glare. There are, fortunately, two excellent remedies to diminish, or even eliminate picture tube glare. One is to use the monitor's swivel and tilt base to better position the screen so that light is not reflected. The other solution is to buy and attach a mesh or glass filter (they're available at most computer stores) on the screen's face.

Accompanying the computer are two book-length softbound instruction manuals, on MS-

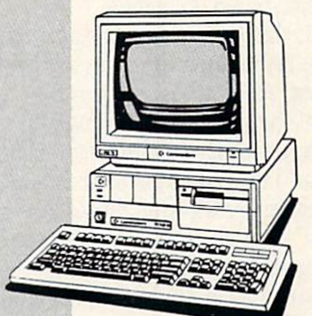
DOS and GW BASIC®, and a 91-page Operations Guide. The books on the DOS and BASIC are the universally standard texts written by Microsoft (the company that produces both MS-DOS and GW BASIC)—together, they provide succinct, thorough, no-nonsense by-the-book documentation. The Operations Guide is simple enough for even absolute novices to follow, offering valuable tips on where and how to set up your computer, attaching cables and powering up for the first time, a checklist of the various parts, components and accessories and a step-by-step guide on getting started.

Unfortunately, as useful and readable as the Operations Guide is, it lacks much material considered essential by more advanced users. For instance, it's missing a sorely needed alphabetical index and clearly drawn schematics labeled well enough to read without a magnifying glass; in addition, its troubleshooting guide should give English-language answers rather than simply referring the user to his local dealer. More important, there is no reference to vital hardware information that the technically sophisticated user must have, such as whether a second serial port can be added and configured, if the hard disk controller actually has a header for adding a second, external hard disk drive (for that matter, the technical specifications on the controller itself), if it's possible to add a high-density 1.44MB 3.5-inch floppy disk drive rather than only a 720K 3.5-inch floppy disk drive, if it's advisable to add a "Y" cable connector to the PC40-III's single free power connector in order to drive an external device like a CD-ROM drive or tape backup unit. If such data are deemed confusing or superfluous for the average user, Commodore should make a supplementary technical manual available for programmers and power users.

Unlike the Amiga and Commodore 64, in which technical support is given via the telephone directly from Commodore's Pennsylvania-based headquarters, the company's official policy is to offer support only through local dealers. (Commodore has one of the largest nationwide network of dealers and authorized repair centers in the industry.) The reasoning behind this corporate decision is that centralized telephone-only support often produces difficulties or frustrations inherent in trying to diagnose and correct problems from a distance. (It also usually means an interminably long wait while holding for the next available technician.) More personalized support is assured by the local dealer.

Incidentally, the PC40-III has a one-year warranty.

The PC40-III is priced attractively and competitively when compared to other similarly equipped AT clones. For your money, you get a handsome, solidly built all-inclusive machine, an indefatigable performer with a high reliability factor and a moderately expandability that insures against early obsolescence. And that, in a nutshell, is what defines a good, all-around computer well suited for either business or personal use. ■



Commodore PC40-III

Manufacturer:	Commodore Business Machines, Inc. 1200 Wilson Drive West Chester, PA 19380
Price:	$2395.00 $2595.00 (with 1403 monitor)
Product Specifications:	
MEMORY	
RAM	1 MB Total System Memory, Expandable to 16MB (640K Base Memory, 384K Extended Memory)
ROM	64K
Video Display RAM	256K
CPU	
Type	80286
Clock Speed	6,8,12 MHz (1 Wait State)
Co-Processor	80287 (Optional)
KEYBOARD	
Number of Keys	ASCII 101, Enhanced AT Design
Type	Typewriter, Tactile Feedback
Numeric Keypad	Yes
Cursor Keys	Independent Cursor Keys In Inverted-T Layout
POWER SUPPLY	112 Watt
INPUT/OUTPUT PORTS	
RS232C Serial	Built in
Centronics Parallel	Built in
Mouse	Uses Commodore® 1352 mouse which, when connected to the PC40-III, acts like a Microsoft® mouse and is compatible with Microsoft mouse software.
STORAGE	
Floppy Drive	One 1.2MB 5.25" (3.5" Optional)
Hard Drive	40MB high performance (19ms) 16-bit AT-Interface drive attaches directly to the Motherboard (conserves expansion slot).
EXPANDABILITY	
Slots	4 full-length expansion slots (3–PC/AT compatible, 1–PC/XT compatible)
Maximum Internal	Two half-height floppy disk drives (5.25" and/or 3.5") and a half-height 3.5" hard disk drive.
VIDEO	
Compatability	Compatible with VGA, EGA, CGA, MDA and Hercules video modes, requires the use of a VGA-compatible monitor.
Text Modes	High Resolution 132 x 25 and 132 x 43 text modes.
Color Modes	Up to 256 colors from a pallette of 262,144 with 320 x 200 resolution or 640 x 480 high resolution with 16 colors from a pallette of 262,144. The video interface also supports 64 shades of gray in monochrome.
SOFTWARE	
Operating System	MS-DOS® 3.30 and GWBASIC® 3.22 included; OS/2 Compatible
Compatibility	Compatible with MS-DOS software.
SIZE	
Dimensions	15.5" Deep, 14.0" Wide and 5.6" High
Weight	21.9 lbs.
OTHER FEATURES	Security lock for keyboard lockout. External sound jack. Built-in ROM based SETUP utility. External configuration switches. Built-in clock/calendar with battery back-up. Reset switch.

Red Storm Rising

by Jim Gracely

On Red Sunday, April 30, 1989, ten newly appointed Vice Admirals competed against the Russians, each other and the clock trying to achieve victory in the Red Alert War Game. The winner would become more than Admiral of the Fleet, because victory also included a seven-day trip for two to Dunoon, Scotland (home of the U.S. submarine base at Holy Loch) and London.

Red Sunday and the Red Alert War Game were the culmination of the *Red Storm Rising* Ultimate Challenge sponsored by MicroProse and *Commodore Magazine*. Based on the MicroProse game *Red Storm Rising,* the challenge was one of the most unusual software contests ever devised. Let me tell you why it was unique, who entered, who won, and why they won. Whether you are just curious, or want some tips on playing the game, you'll find it here.

The Challenge

It all started innocently enough—"Let's have a contest based on *Red Storm Rising.*" But the question of how to create a contest based on a strategy game soon arose. How would you enter? How would we verify the scores? What would the prizes need to be to encourage enough people to enter? And, inevitably, How would we insure that no one cheats?

Now, the question of cheating turned out to be the biggest single problem. If you can't eliminate cheating, then the contest won't be very fair (or much fun). In fact, it is for this very reason that you don't see more contests based on games.

However, cheating while playing a computer game is not quite the same as cheating on a test. After all, if you own the game, what's wrong with cheating? In fact, we run an entire column each month ("Gold Mine") that contains instructions for cheating on a variety of games. From "backdoors" to hints, from taking advantage of programmer's slips to editing a disk, there are lots of methods of cheating. The word *cheating* doesn't even seem to quite describe this method of "accelerated success." But until someone coins a new phrase, I'll have to call it cheating. This cheating can roughly be broken into two categories that I'll refer to as "play cheating" and "hacking."

"Play cheating" is something that anyone playing the game can use. For example: hold down the SHIFT key and type "FUND" in *Sim City* to quickly acquire an extra $10,000. In *Summer Games* if you make a dive and just hold the joystick to the right, you get a perfect score. The first is a hidden feature, the second possibly a programmer's slip (Epyx claims it's a feature), but they both allow you to cheat. So you could say that play cheating is just taking advantage of the game's design.

"Hacking" is a little more sinister. You might edit the scores sector on the disk to give yourself additional strength or abilities, or type in some POKE commands to do the same. Some people actually alter the game code on the disk to make "unlimited lives" versions, change the enemy or give themselves some other advantage. Still, if it's your game and if you've gotten as far as you can on your abilities, why not hack? I must admit I have used this method on occasion to get a little (sometimes a lot) further in a game.

When the question of cheating came up in this contest, two truths were self evident: Play cheating had to be allowed (it is a part of the game), and hacking had to be eliminated from the contest. Hacking, after all, is actually altering the game in your favor to create an unequal competition.

MicroProse claimed that play cheating wouldn't be a problem because there was no way to play cheat in *Red Storm Rising*. In retrospect, it appears that they were correct; no one reported anything more than some very mild tricks. Is there play cheating in *any* MicroProse game? Well, as it turns out *Pirates!* is filled with ways to play cheat as is *F-19 Stealth Fighter*.

Hacking is always possible in any game, and it can be very difficult to detect. The only possible way to eliminate hacking was to make the contest so dependent on actual game knowledge and so closely scrutinized that any hacking would be quickly detected. This then was the birth of the Ultimate Challenge. Here's an overview of the stages of the contest, and the steps each entrant took to get from entering the contest to the final confrontation of the Red Alert Game.

A potential contestant needed to obtain both the Ultimate Challenge Official Rules and an Ultimate Challenge Official Log Form. They could either return the postcard that appeared in *Commodore Magazine* or write directly to the *Red Storm Rising* Board of Naval Examiners to get this paperwork.

The rules hinted at the coming complexities of the contest with discussions of telephone interviews, verification equipment and communications from the Board of Naval Examiners.

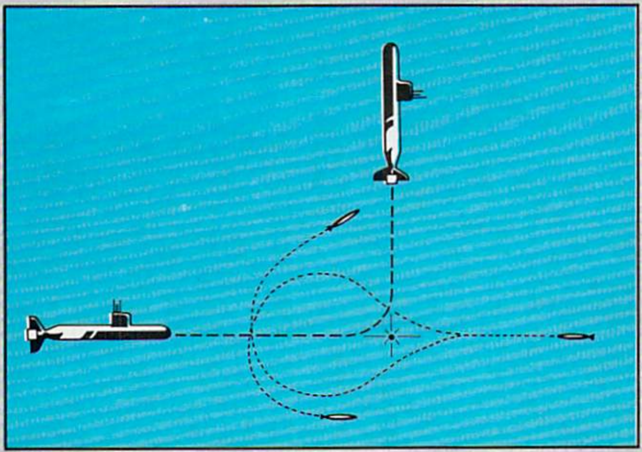
The contestant then played the World War III campaign of *Red Storm Rising* using all his or her abilities (including play cheating) and recorded the results on the log form. The log form required the results and complete details of each encounter of each battle (typically 7–10) within the campaign as well as cumulative and final Efficiency Ratings. The completed log form and the final game-save disk were then sent back to the Board of Naval Examiners.

MicroProse received over 500 of these completed log forms with disks. The 15 top entrants were promoted to Rear Admiral, and their entries were checked for accuracy and completeness. As newly appointed Rear Admirals, these entrants had a tough first assignment: pass a telephone interview by the Naval Board of Examiners. While tough, it also gave them the chance to very quickly move up to the position of Vice Admiral.

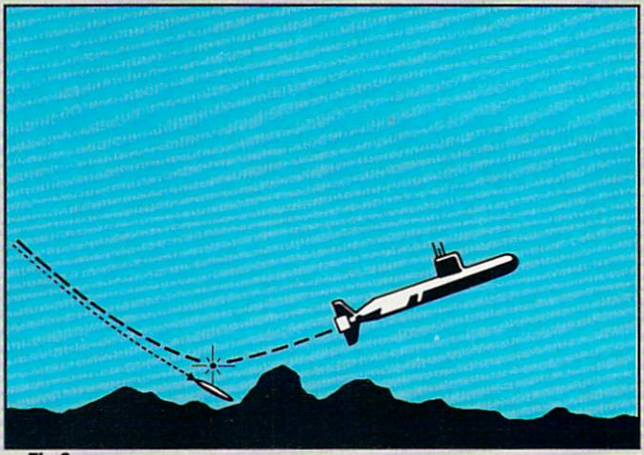
At this point MicroProse found no disks that were "modified" and no log forms containing inaccurate information. The telephone interview was both a method to determine the ten best players and a further attempt to verify that these 15 Rear Ad-

THE ULTIMATE CHALLENGE





Tip 4



Tip 6

Advanced Tips

Here are some tips and hints for the player who has earned his sea legs and wants to get some extra ER points.

1 Nothing gives you more points than an all-submarine mission. Save the game after your first successful mission. Keep restarting the game at the same point until the computer gives you an all-submarine mission. Play the mission successfully (the hardest part) and save the game again. Keep repeating this procedure. This is how our top entrant (Thomas McClimans) was able to get 40,750 ER points.

2 If you are put into a scenario with electric subs around you, go active and fire a torpedo! As one Rear Admiral worded it: "With an electric, by the time you have even a 50% solution, they already know where you are."

3 While you may not want to attack an enemy vessel before you get an 85–99% solution, you can launch torpedoes prior to that. Put your torpedoes in the water when you get about a 50% solution, but set the PAP (pre-planned activation point) short of the mark. You can keep moving the PAP to get closer to the target as the solution improves. If you have time, you can have your torpedo go active when it is sitting right on top of the enemy vessel.

4 An evasive maneuver when a torpedo is homing was suggested by more than one of our Rear Admirals. This is a variation on the "Dance to the Side" technique in the manual. In this technique, you turn your submarine to face the torpedo. When you get within about 2000 yards, you launch a noisemaker (and/or a decoy) and knuckle to the left. In the advanced levels, the Russian torpedo will drive around the noisemaker and try to reacquire using either a left or right search pattern. If it uses a left-search pattern you're clear. If it uses a right-search pattern, continue turning hard and you should pass through the torpedo's turn radius before it reacquires your sub.

5 The top ER ratings are given for playing in the year 1996, on the Ultimate level, using a Sturgeon class submarine.

6 In shallow water, a torpedo that is homing on you is much harder to shake. Because there isn't much room to maneuver, it is almost necessary to become proficient at the technique of driving a torpedo into the sea bed. The concept is simple; dive towards the sea bed, and when you get uncomfortably close, launch a noisemaker and begin rising. If you time it correctly (and avoid grounding yourself), the torpedo will run through the noisemaker into the sea bed. The same technique can be used with ice flows and under the Arctic icepack as well, by rising first and then diving. Although the concept is simple, you need to practice timing and using the "Shallows Depth" map overlay.

The Vice Admirals

R. Brian Fritz, Ashland, KY
Paul D. Garrett, San Angelo, TX
Kenneth E. Gillespie, Poulsbo, WA
James A. Kent, Colton, CA
Michael Kwiatkowski, Welaka, FL
Thomas McClimans, Caldwell, ID
Thomas E. Newland, Homestead, FL
Anthony Palumbo, Bayshore, NY
Robert Allen Rusk, Wiesbaden, West Germany
Alan Darcy Smith, Eugene, OR

mirals had gained their positions by skill alone.

The telephone interviews were about 15 minutes long and allowed the four Naval Examiners to ask any manner of question about the game, tactics, strategy and personal preference. As one of the examiners, I can verify that all 15 of these guys (nothing sexist—all 15 were, in fact, male) knew how to play *Red Storm Rising!* In fact, during the conversations many useful tips were mentioned that will be revealed a little later.

The four Naval Examiners choose ten of the Rear Admirals to be promoted to Vice Admiral, with the opportunity to play the Red Alert War Game on Red Sunday. On Red Sunday each Vice Admiral had four hours to successfully play 16 different battles. Ranging from tough to nearly impossible, these 16 battles were created by Roy Gibson at MicroProse especially for this event.

During the week preceding Red Sunday the ten Vice Admirals received an unusual package from the Board of Naval Examiners. In the package were the rules for Red Sunday, a description of the verification equipment (a VCR) and a package of 13 sets of disks.

Each Vice Admiral was required to obtain the use of a VCR for Red Sunday. If the Vice Admiral didn't own one he could

rent one (and would be reimbursed). They also had to figure out how to connect the Commodore 64 to the VCR and the VCR to their monitor. They again were reimbursed for any cables or connectors that had to be purchased. When everything was set up, the Vice Admirals could play the Red Alert Game on the computer and record everything on the VCR at the same time. The purpose of the VCR? To verify that each Vice Admiral adhered to the rules without any abnormal assistance (hacking).

The 13 disk sets contained one practice set and 12 possible sets of game disks. The practice set was not to practice the battles, but to practice opening the other disk sets! Each set was sewn together with fishing line, sealed in an envelope, wrapped with a couple of yards of plastic tape and covered with MicroProse labels. The use of 12 sets of possible game disks was to insure that no one took a sneak peek at the game disks for Red Sunday. Only one of the 12 numbered disk sets contained valid Red Sunday disks. After Red Sunday, all 12 sets had to be returned—unopened!—except for the one set they were instructed to open.

On Red Sunday, each Vice Admiral was telephoned and told to turn on his VCR and to begin recording. They were then instructed to type a code word on the 64 (the code word was *baseball)* and press RETURN. Of course this created a syntax error, but the purpose was to get it on the videotape. They were then given the number of the disk set to open and play. Four hours later, they were telephoned again and told to stop. The results of battles, completion of each mission, and Efficiency Ratings were recorded, and the Ultimate Challenge was over.

The VCR tape, completed log forms from Red Sunday and the unopened disks were returned to Red Storm Headquarters for final verification. Once all the Red Sunday materials were verified, the winner was announced.

The Players

Now that you understand how it all worked, we can look at the players themselves. MicroProse received almost 2000 requests for the Official Rules and Log Forms. From these requests, 453 players returned completed log forms for a total of 556 entries (some players submitted multiple entries). The entrants were immediately divided by the total score (ER rating) on their log forms. The ER spread was from around 1000 points to over 40,000 points.

A glance at the list of contestants shows that maybe four out of the 453 entrants were female. The most determined player? Well, N. Bausch of San Diego entered ten times between January 24 and March 31, 1989. Each time he (?) entered, the ER rating was higher. In fact, with another week or two of play he probably would have made the top 15. The earliest entry received was on January 23; in fact there were three received that day. The earliest entrant to make it into the top 15 was received on January 27.

In all, 22 entrants had ER ratings above 30,000, while 27 had ER ratings below 10,000. The scores were spread along a pretty typical bell curve. (A bell curve looks like a bell and represents the statistical spread of scores, or people, or some other statistic among a sample.) In this case it verifies that the entries weren't skewed by some unknown variable (like an unknown trick to instantly get a 20,000 ER.)

> One of the results of this complexity is that there are no right or wrong strategies.

The Interviews

The Naval Examiners interviewed each of the 15 Rear Admirals for about 15 minutes. In that time we found out a little about their style of play, their reactions and tactics employed in specific situations, and their weapons of choice.

Red Storm Rising is amazing in its complexity. More than one of the final contestants noted that he thought it was incredible for a game such as this to run on a Commodore 64. One of the results of this complexity is that there are no right or wrong strategies. Whatever gets you through is correct. Depending on the player, that means different tactics. Here are some of the tactics used by our top 15 entrants and their comments on missiles, torpedoes and evasion.

All 15 of the top contestants referred to themselves as "aggressive." They all were quick to attack, while still insuring the safety of their sub. It was the method of attack that showed the differences in their styles. There were two main attack methods used against surface ships, one using MK-48 torpedoes, the other using Tomahawks.

The torpedo attack is carefully planned. You track the enemy ships quietly and carefully until you are within 10–20K yards with a solution of 80% or better. You then fire a couple of torpedoes at an angle away from the ships and have them run deep. By aiming off to the side of the ships you can hand guide them around into the enemy without them having any idea where you might be. Actually, they think that you are in the direction that the torpedoes came from. This method can be used to easily destroy four or five ships, without anything being shot back at you! The only shortcoming to this method is time—you spend a lot of it waiting and guiding.

The Tomahawk attack is much faster, and can also be used to take out several surface ships. However, you won't get away without being shot at. Only two of our top 15 contestants used Tomahawk attacks, but they were both successful with them. You start, as with torpedoes, by getting an initial solution on the location of the enemy ships. Now things start getting hectic, so be prepared to react. Get up to flank (top) speed and surface! Turn on your radar and you'll immediately get accurate fixes on all surface ships. Fire a round of Tomahawks, and keep your eyes open. Missiles and torpedoes will start coming your way, but don't dive! By staying up you can track incoming missiles, keep an eye out for helicopters, and maintain accurate fixes on the ships for your next round of Tomahawks. The results? Those who do it well are able to get through those scenarios pretty quickly. In fact, our Grand Prize winner used this attack method!

Unfortunately, all-ship scenarios are fun but infrequent. Anti-submarine attack groups, submarine wolf packs and convoys with submarine escorts are much more common. Each of these scenarios requires its own ever-changing attack strategy. So instead of asking about strategy, we asked the top contestants about their weapons of preference and their observations about each weapon.

Mark-48 Torpedoes: Obvious weapon of choice for all submarine kills. Widely used on surface ships as described previously.

Tomahawk Missiles: Weapon of choice on unarmed ships once armed ships are destroyed. Used on surface ships at great distances and as described previously.

Harpoon Missiles: Faster than the Tomahawk and less likely to be shot down, but doesn't have as much range and

unlikely to take out a ship with one blow. Not a highly used weapon for any of our top contestants, but used occasionally in a rush.

Sea Lance/Mark 50: A missile with a torpedo inside. Limited usefulness. The most popular use of this weapon was to keep an enemy submarine busy while hand-guiding an MK-48 in for the kill.

Stingers: Mast mounted and only used for shooting down helicopters. While the top contestants were divided as to whether to attack helicopters or avoid them, this is the required weapon if you need to get rid of one.

Other information gathered during the interviews was less universal, and I'll discuss some of the specific hints a little later.

Red Sunday

All the elements of the Ultimate Challenge led up to Red Sunday. The Vice Admirals each came into Red Sunday on an equal level. Each would have to play the Red Alert Game to the best of their ability to be named Admiral of the Fleet and claim the Grand Prize.

The Red Alert Game was a series of 16 mission scenarios designed to be played in sequence. The class of submarine the player used, the year, the water conditions and the enemy varied with each mission. This was a true test of a player's abilities. The class of the submarine affects speed and weapon quantities. The year affects the types of weapons available. The water conditions affect tactics, introducing problems such as shallow water and pack ice. And of course, the enemy varied creating everything from one-on-one submarine fights to convoy attacks to submarine wolf pack battles.

Both *Commodore Magazine* and MicroProse Software wish to thank Roy Gibson at MicroProse for his work on the Red Alert Game disks. Roy designed and programmed the 16 scenarios that were played. He also copied all the disks that were used.

On Red Sunday, each contestant had four hours to complete as many of the 16 scenarios as possible. The rules were simple: the missions had to be played in sequence, however, players could replay any mission any number of times before moving on. Each replay of a mission voided any previous plays of that mission. The scoring gave three points for each mission successfully completed (objective destroyed) without any damage to the player's submarine. One point was given for each mission successfully completed with some damage to the player's submarine. No points were given if the player's submarine was sunk, and/or the mission was not successfully completed.

At the end of the four-hour period, each Vice Admiral reported the results of each mission. The total number of battle points for each Vice Admiral were calculated, and as soon as the results were verified, the Grand Prize winner was notified.

Grand Prize winner Michael A. Kwiatkowski of Welaka, Florida obtained the rank of Admiral of the Fleet by successfully completing 11 of the first 12 battles with no damage to his submarine.

Anthony Palumbo of Bayshore, New York won the first place prize by successfully completing nine of the first 12 missions. Thomas C. McClimans of Caldwell, Idaho won the second place prize by successfully completing eight of the first nine missions. Both will receive a Commodore 128D computer system, a complete library of MicroProse software for the Commodore 64, a one-year subscription to *Commodore Magazine* and *Red Storm Rising* materials autographed by Tom Clancy.

None of the Vice Admirals got any further than mission number 12. In fact, only Kwiatkowski and Palumbo even got past mission number 10! Of the first 12 missions, one seemed to give everyone fits. Mission number 5 was played under pack ice, in shallow water with your mission to destroy a boomer (ballistic missile submarine). What made it tough were two Alpha class nuclear attack submarines escorting the boomer (the Alpha class subs are the world's fastest). Only McClimans successfully completed this mission. Palumbo managed to get the boomer, but ended the mission damaged.

A contest as complex as this must be run by a dedicated individual. In this case, we had Jack Kammer, who works in marketing at MicroProse and was really the initiator of this contest. As Registrar of the Naval Board of Examiners, Jack was the players' contact from start to finish and was also responsible for creating and distributing mountains of materials. The success of this contest was directly the result of Jack's involvement. Well done Jack.

Looking back on the contest, I hope it was as much fun for those who entered as it was for those of us running it. Every disk that was checked was valid, and of the entries checked, not a single hacker was found. Whether it was because of the rules, or the nature of the player we'll never know. We thank everyone who took the challenge, and congratulate our winners.

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held in Los Alamos, New Mexico in 1988. It is poetic irony that this site—the home of the atomic bomb—should be chosen.

No one really knows exactly what A-Life is, but those who are experimenting with it are defining it as they develop it. Looking at the characteristics that biologists use to define life—ability to reproduce, adapt to their environment and to grow—some computer codes could be defined as life. A Core Wars warrior, (see the May '89 issue of *Commodore Magazine*) for instance, could be endowed with the ability to reproduce, adapt and grow.

If we can digress to the barest essence of life, the DNA molecule, isn't DNA just a piece of digital information? It is exactly that, computer code. The only real difference between it and computer code is that one DNA "bit" has four possible states rather than two. Physically, DNA is comprised of molecules rather than just electron motions and patterns, but the function of both is identical.

A-Lifers hope to achieve the creation of a living electronic organism. Again, let me reiterate, this will not be artificial consciousness, just artificial life. This A-Life "organism" will have the ability to reproduce, adapt itself to differing environments, grow, move, and perhaps someday, even evolve.

While simple replication such as an amoeba splitting itself into two amoebas, is done regularly with computer programs, an interesting experiment is being planned at a Northeastern University wherein two computer programs with different codes will be programmed to reproduce sexually, that is, to take parts from each of the "parent" programs and create a new spawn with components of each parent. Some randomness will have to be added to the system so that an evolutionary pattern will occur. Mutant "children" may or may not have the ability to reproduce depending upon the conditions and which elements of the parent's code are present or absent.

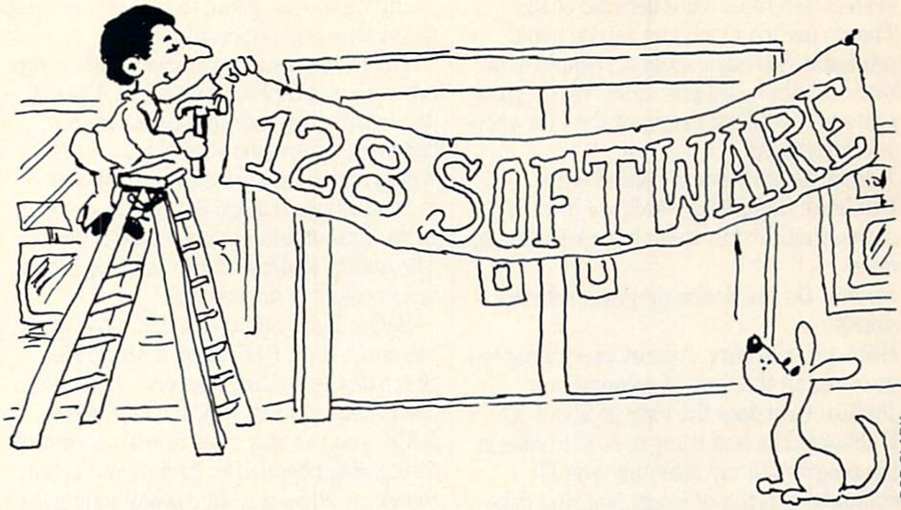
All of these conditions will be set up in the computer, then the system is allowed to just run for 10,000, 100,000, 1,000,000, 10,000,000 generations. What will happen? What can we create? No one knows the answers yet, but serious A-Lifers all over the country are electrified by the possibilities.

It would be sheer folly to speculate about what research in A-Life will bring, so I suppose that I, like everyone else, will just have to wait and find out.

by Mark Jordan

A Look at Free Spirit Software

Next month we'll return to exploring the 128's native mode through programming. For now, however, we'll talk to Joseph Hubbard, president of Free Spirit Software and one of the 128's biggest fans, and we'll take a look at his latest release—*Sketchpad 128*.



BOB CLARK

The big lament of 128 users is this: "Why isn't there any 128-specific software?" I can sympathize with this emotion. However, it isn't a completely true assessment. There's GEOS 128, no small software production. There are several good word processors including *VizaWrite 128*, *PocketWriter*, et al. Several excellent databases are available—*Superbase 128* comes quickly to mind. And *Vizastar 128* is no slouch for a spreadsheet. Oh, let's not forget *BASIC 8*, a truly remarkable graphics language for the 80-column mode.

I know, you'd be happy if there were some games that were 128 enhanced. And it would sure make you feel better if you knew there was a software company or two out there dedicating themselves to the 128.

Well, feel better: Free Spirit Software, Inc. is doing just that. They presently have several titles they are offering at reasonable prices and more are being added. Most of Free Spirit's software supports the more esoteric features of the 128 including bit-mapped graphics with the 80-column screen, color dithering, REU support, 1581 support, and even support for the 64K video RAM that comes standard with the 128D (and which you can install yourself with a kit). And, I'm happy to report, there is no copy protection on the software.

This month we'll take a look at Free Spirit's philosophy and a look at one of the nicest programs available from them, *Spectrum 128*. We'll start with an interview.

Mark Jordan: Could you give me a little background on Free Spirit Software?

Joe Hubbard: We started out a little over four years ago, in April of '85. We started out of the house, a spare bedroom operation. We quickly developed a broad-based product line; while any one of them might not have performed that well by itself, combined they did well enough to keep us going. We also tried to hit places where no one else was doing anything. A good example of that would be *Super 81 Utilities*, the first commercial program out for the 1581. It was nearly a year before anyone else came out with anything.

Also, the whole 128 market was good for us: we have a number of titles out for the 128. Right now, we're the only one with a paint program that takes advantage of the 80 columns—*Spectrum 128*.

Jordan: What's been your hottest product?

Hubbard: Well, it may surprise you but our most consistent product has been our 1541/1571 drive alignment program. We sell as many of those now as we ever did. It's been a very consistent seller.

Jordan: How many total programs do you offer?

Hubbard: We have all together a little over 100 titles. Out of that only about 40 are really active.

Jordan: How much of your business is 128 related?

Hubbard: The 128 line makes up about 50 percent of our volume right now. The 128 market is the one that really brought us from just another spare-bedroom software company. Now we have *BASIC 8* and it has been a tremendous shot in the arm. We just got the legal rights to it about four weeks ago. We had a heavy back-order situation to say the least. And along with *BASIC 8* we now have *BASIC 8 Toolkit*. And we have *PosterMaker 128*. These are our latest 128 products. Of course, we also have *Sketchpad 128*, *Spectrum 128* and *NewsMaker 128* as well as others.

Jordan: With *Spectrum 128* on the market, is there any viable market for *Sketchpad 128?*

Hubbard: Yes. There are a lot of people who have the standard 128 without the extra video RAM. That's really the main difference between the two, the use of the 64K video RAM and the use of color.

Jordan: How about *NewsMaker 128*, does a person with *geoPublish* need it?

Hubbard: Well, it does use the 128 mode. If they already have *geoPublish*, they are probably already set. But if they're looking for an inexpensive desktop publishing 128-mode setup, then *NewsMaker* is it.

Jordan: *BASIC 8* was a real coupe for you. I know it's been around awhile and there were some problems with a previous distributor. I've been wondering if Lou Wallace and David Darus are done with it or if they plan to do anything more with it.

Hubbard: There are going to be some further projects in the 80-column graphic mode. One of the things they are working on is a *BASIC 8* compiler. Also, near completion is a sound library for the 128 which can be incorporated into *BASIC 8* or BASIC 7.0 programs to create talking programs, etc.

Jordan: What else is in store for the 128 from Free Spirit?

Hubbard: We have three clip-art disks coming out to go along with *Spectrum*, *Sketchpad* and *BASIC 8*. They'll be $9.95 each. There will be roughly a hundred pieces of clip-art on each disk.

Jordan: Let's switch to a darker topic: has piracy been hurting you at all? I know you don't copy-protect.

Hubbard: It hurts us no worse than anyone else. I figure pirates are going to steal things no matter what. I think in some ways we may have taken away piracy by taking away the challenge. I think we've

even gotten some sales because of that. There's not too much you can do about most of it. We have caught a couple of pirate bulletin board operators. We do prosecute to the fullest extent of the law when we catch them.

Jordan: Good. Put 'em behind bars.

Hubbard: [*Laughing*] Well, we haven't gotten that far, but there have been some fines.

Jordan: Do you desire program submissions?

Hubbard: Oh, sure. Almost everything we do comes in the form of submissions.

Jordan: How does the user go about it?

Hubbard: The best thing to do is to submit the program to my attention and I'll evaluate it. I look at every program submission that comes in. If it's something that we want to publish, we send out a contract right away. Or if it's good but needs changes, I send a letter suggesting what needs to be done. If it's not marketable I send a letter stating why.

Jordan: How many submissions to you get?

Hubbard: A lot. Roughly a half-dozen submissions a week. We get a fair number of games. We're interested in all types of software. I'm not too interested in databases and word processors because there are a lot of them out there. Niche applications are best.

Jordan: What's the future of the 128?

Hubbard: I think there's going to be a good, solid dedicated base of 128 users for a good time to come. Of course, a company has to keep their eyes open. While our 128 market is good, I do see signs that the eight-bit market is softening. But there is still lots of life left in the 128.

Spectrum 128

This is Free Spirit's most polished package thus far. It's done by Dave Krohne, a.k.a. the "Whiz Kid," who is the company's ace programmer. This package, like *NewsMaker 128* and *Sketchpad 128,* is built on the *BASIC 8* development system. [***Editor's Note:*** *For a complete review of* Sketchpad 128, *see page 18.*] On the plus side that means that it does more with your 128's 80-column graphics than you might have ever thought possible. On the minus side, that means that it is somewhat slow . . . after all, *BASIC 8* is an interpreted language. It'll sure be nice when they get that compiler done.

That said, I must quickly add that the rubber-banding effect, the line functions, and most of the drawing functions are just as fast as their all-machine-language counterparts in GEOS 128. It's only in changing modes, going to menus, etc. that the slowness is noticeable.

The first question you should ask before buying any graphics package is, Does it do anything my existing packages don't do? I can assure you that *Spectrum 128* will give you an affirmative answer to that question. Shaded 3D shapes are easy to do. Tons of font options are available. The ability to draw in as many as 128 different colors is impressive.

Before I get you too excited, note this: you must have 64K video RAM to run *Spectrum 128.* Also, you have to have a 1351 mouse. If you lack the 64K video RAM, you can buy Free Spirit's earlier offering, *Sketchpad 128.* And if you lack a mouse, well, as the old cowboy song goes:

Life on the range,
Just ain't been a nifty one,
Since my horse ate my 1351.
Whoppie ti yi ye yi yay.

I am happy to report, *Spectrum 128* supports both mouse buttons very effectively. You won't need a 1750 REU to use the program, but it makes it nice. With the 1750 you can store all the fonts to RAM, all the patterns, up to five full pictures, up to five full-sized graphics.

There are five main menus: Paint, Shapes, Solids, Tools and Options. In the first two you'll get all the graphics functions you would expect in a graphics program including circles, lines, rays, boxes, polygons, air brushes, cutting and pasting, text editing and more. They are all implemented in an intuitive way that took me all of ten minutes to get used to. The only missing function I felt a need for was an Undo command.

One nice additional feature from the Shapes menu is the ability to change your "Preferences." Though it isn't a complicated procedure, the manual does suffer in explaining how this set of options works so I'll try to explain.

First, you're given the option of changing the "thickness" of your graphics. Don't be tricked into thinking this changes the width of your drawing tool—it doesn't. (That can be done in other ways.) What it does is allow you to select a value between one and 99 which is how many times your graphic will be drawn.

Confused? Let's say you select a thickness of 15. Then if you draw a box, it will draw itself 15 times.

Still confused? Then you need to learn about the X and Y Overlay values. They are simply the offset values of each successive box out of your 15. For instance, if you set the X Overlay to 2 and the Y to 3, then each successive box would be over 2 and down 3 pixels from the one before it. You can set the offset to be either left or right, up or down. The result of all this is that you can easily draw tubes, hollow boxes, and conical shapes, in other words, 3D drawing.

There's even another pair of settings, Unplot Vertext and Unplot last function. Unfortunately, I still haven't figured out what they do. The manual, as I indicated, glosses over these features, expecting the users to learn by doing. Not a bad approach, but a paragraph of explanation would've helped.

The Tools menu is where you get to do things like Cut, Paste, Fill, Write, Edit colors, Edit pixels, Slideshow and Modifications. The Cut and Paste functions are fast and intuitive. Fill is powerful since you can fill not only patterns but also colored patterns. The only drawback is that you have no idea what the different fill patterns look like until you try them.

Writing is feature-laden: you can choose from lots of font types, adjust both the X and Y axis of the fonts, print with text facing up, down, backwards and forwards and more. It reminds me of some of *Doodle*'s capabilities which I always felt were the among the best.

The Pixel edit mode is okay. Unfortunately, there isn't any cursor key fine-tuning allowed, and it's a little tough to tell what pixel you're on. The Slideshow option is convenient and works well. The Modifications option is where most of that text power I mentioned can be invoked. It also allows you to clip and save your own fill patterns from the screen, as well as some other graphics features.

The Options menu lets you change drives, load files (and patterns and fonts), use the RAM disk, set up your printer, print and exit the program. Nothing really new here except the RAM disk option—which is a lot. The printer drivers supplied should work with most setups, though you'll have to do some experimenting to see what works with yours. I couldn't get the Star NX-10C driver to work even though that's my printer, so I used the MPS-801 instead. It worked fine but it has fewer features.

One of the biggest annoyances of the program is there isn't any way to stop doing things once you start. With printing this is really a problem since it takes ten minutes or more to print out a screen. And if you have to fiddle with the different printer drivers to get one to work, this is more than an annoyance, it's a royal pain

in the be-hind. I eventually resorted to simply resetting the computer and rebooting the program. Also, if you accidentally invoke the fill command on some wide-open real estate, you might as well go spend some quality time with the family. It's going to be awhile before you can do any more drawing.

I mentioned one question everyone should ask before buying a second (or third or fourth) graphics program. Here's a second question you should ask: What do I need this program for? I personally am not a software collector . . . I only buy things I plan to use. *Spectrum 128* meets my needs for a program that will create hi-resolution color graphics for the 128. As a programmer, I can use these graphics screens in other programs, particularly games. *Spectrum 128* makes it easy. Even if I weren't a programmer I'd want this program for the ability to create graphics for graphics contests. Here's hoping that next year *Commodore Magazine* graphics contest will include a section of artwork done by a 128 in 80-column mode. (Hint, hint.)

In conclusion, *Spectrum 128* is a winner. At $39.95 you can't go wrong. ■

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can offer some help on getting beyond the gate of your dreams. Before you go to sleep, be sure to brush your teeth and dress for sleep. And be sure to take a toothbrush, sandwich, plunger and gun to bed with you. The toothbrush is good for picking locks; some of the characters you meet can be bribed with something as simple as a sandwich; and you should hold onto the plunger until you meet your worst nightmare. Oh yes, it is OK to use the gun if you have to, and drink too much now and again. After all it is only a dream, isn't it? And as is true of any adventure game, be sure to save your position in the game before trying anything risky, so you won't have to start from the beginning if you die.

If you enjoy adventure games, you should consider *Dream Zone*—it has all of the ingredients which make such games worth playing, plus good graphics, sound and a wonderfully friendly interface. The game's icon input interface and sensible memory management make this a game novice and experienced adventurers can both savor.

**Also available for MS-DOS machines.* ■

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vague, to outright answers, so you can always get just enough information to help you think through a particular puzzle. But because these hints are so readily available, you may have to initiate a bit of self-restraint in order to resist the urge to use hints every time the going gets tough.

Several other notable features have been incorporated into *Shogun:* A macro function which will allow a player to program the function keys with often-used commands; a Color command to change the background and foreground colors of the screen; and an Undo command that permits you to take back a command once it has been executed. (If you do something that gets you beheaded, just type "undo" and try something different.)

Having been exposed to both the novel and mini-series, I was a bit skeptical about whether or not I could enjoy an adventure game when I already knew the ending. Well, put your fears aside. *Shogun* successfully brings the glory and extravaganza of the book to a personal level, except this time you are living the tale. Besides, how many times have you reread a good book, knowing full good and well how it would end? ■

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(more turn up later, opening the door for new spells). If you're like me, you'll appreciate the way Blank included alternative solutions for a number of puzzles.

A number of alternative conclusions are also on tap—and that doesn't just mean a lot of different ways to get killed, which is usually the case in an adventure. Instead, an unsuccessful ending might simply see the group give up and go home. One of the game's selling points is that there are "virtually no dead-ends . . . any action you take advances the story toward one of its many endings," only one of which is deemed best. This means that if, by certain points in the story, you haven't found enough Stones, or have lost too many party members, the game ends. When it does, you'll get a chance to read Musings, afterthoughts that appear in the Journal and give you hints about puzzles you failed to solve. The advantage of this scheme is that it won't offer clues about other problems, so you can't just read right through all the clues and spoil the surprises.

And what of Infocom's graphics? Done by Donald Langosey (who also "painted" *Shogun*'s illustrations), they are strikingly envisioned and executed, showing how a talented artist can enhance the atmosphere conjured up by imaginative prose. There are no sound effects or music. A second drive or hard disk is supported, as is a printer, so you can get a copy of all the text.

All are available for the Amiga with no 64 version planned. (Infocom's *BattleTech,* covered in a recent "Adventure Road," is a straight role-playing game that's also out for the 64.) My favorite of the new graphic games is *Journey,* because I enjoyed reading this fantasy as much as I did solving the puzzles, and reason that it will be most enjoyed by people with an interest in fantasy fiction like Tolkien's *Lord of the Rings. Zork Zero* is as much fun as it is funny, containing more locations (over 200) than any other Infocom game and more puzzles than the entire *Zork Trilogy. Shogun* is a more unusual tale recommended for those seeking something more exotic.

Bugs in *Demon's Winter*

SSI forgot to include the data card with the Commodore 64-specific instructions, which can be obtained by writing to them. The main thing to know is that you have to copy the disks and play from your copies. But a host of programming bugs have been reported. After selling a cursed dagger that had been exorcised, one QuestBuster reported getting "illegal quantity error" that dumped the game into BASIC. Another problem looks more like a design flaw than a bug. Once you take an item, it's gone forever—the program clears it from your disk. The problem is that this sort of predicament might arise: after entering the Crystal Cave to find the Icicle, all your party members could get the icicle but die from wounds incurred while battling the bear. Even if you reload a game just saved before entering the cave, however, the icicle won't be there, so use your original dungeon disk to go into a cave and get the item, or use a second copy of the dungeon disk.

Recent and Coming Conversions

An Amiga version of *The Magic Candle* is reportedly a burning issue at Mindcraft. The Commodore 64 version of *The Last Ninja II,* an action adventure, is out. Broderbund's *Where in the World is Carmen Sandiego?* is now available for the Amiga. So is First Row's graphic adventure, *The Twilight Zone. Star Flight* should be ready by the summer for Amiga space-gamers, with a Commodore 64 version set for September. ■

Software Reviews/The King's Rule

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castle gate. This is the player's permission to enter the next level of play.

The Guard's Room

Riddles here are only a bit more challenging. This time, the numbers in the set have been consistently multiplied or divided by numbers from one to five. For example, in 4-8-16, the second number is two times the first, the third is two times the second. Thus, the rule is "numbers multiplied by two, ascending."

The Game Parlor

Play becomes more difficult at this level which incorporates the rules for patterns used in games one and two, as well as ten new rules. Here are a few representative riddles and the rules they illustrate:

Ex. 1: 12-6-18 — All numbers divisible by three.

Ex. 2: 18-12-6 — The first number, minus the second equals the third.

Ex. 3: 56-96-32 — The numbers have a common divisor—eight.

Examples one and two clearly indicate the difficulty of this program even at the mid-range complexity and emphasize the necessity of brainstorming all theories before drawing hasty conclusions. In example one, most youngsters will assume the rule is "numbers divisible by six," not three. Pursuing this notion single-mindedly, they may invent sets in which all numbers are multiples of six (for example: 12-24-18, 36-6-12). Any such set will result in a "yes" response from the program, a fact which may lead the impetuous to conclude incorrectly, "numbers divisible by six."

Only kids who have learned to be wary of circumstantial evidence will go beyond this initial insight to the problem's true solution. In this instance, an initial brainstorming process is more likely to reveal three as another factor of all the numerals encountered here. Subsequently, the good problem-solvers may think six is the key, but will test the theory against numerals divisible by three only. When they get a "yes" feedback for sets such as 12-9-18 they will discard their first idea (nine isn't divisible by six) and conclude the pattern is "numerals divisible by three." Use of this program therefore, will encourage youngsters to be more thoughtful and systematic at the beginning of the problem-solving process. They will see for themselves that success depends on effective brainstorming and follow-up strategies. Later, I will demonstrate how the adult may facilitate this process with specific techniques for guidance.

Other Levels

Beginning with Level 4, The Magician's Study, this program requires the use of a thoughtful and systematic process of problem solving. Here, there are 18 possible formulas in which the third number is the result of an operation—addition, multiplication, subtraction or division—involving the first two numbers, and in some instances, a constant. An example in documentation is the set, 2-3-50. Here the first, plus the second is multiplied by ten ((A+B)*10).

The Royal Suite attempts to deceive with obvious suggestions that don't work. For example, with the set 100-200-300, the rule may not be "multiples of 100" but something less likely, such as multiples of two, or five. Problems at this and the next level will challenge the most gifted youngsters and would be a very valuable group enrichment activity.

Finally, Level 6, The King, is the most challenging because rules may apply to only one or two of the numbers. For example, in the set 64-66-68, the rule might be "the second number is even." A total of 20 such rules operate for sets generated by this level. That's a lot of problem-solving activity for any classroom.

Instructional Suggestions

This is an extremely powerful and innovative problem-solving package that will entertain and challenge children with a wide range of abilities. It is definitely the type of program that should be used at home as often as the *Carmen Sandiego* pursuit series. In schools it could have even more value as the basis of a unit on problem-solving or thinking skills.

In both environments, I would suggest the following type of adult guidance. First, parents and teachers should embrace the fact that two heads are always better than one. Step one then, is to encourage kids to work cooperatively (with one or two partners). Only then will anyone succeed with step two, the generation of all or most possible theories. Adults should encourage children to list these on paper. I'd begin by directing kids to observe the numbers (for example, the set 5-20-80) and ask questions intended to guide them through the solution process. Later, I would expect children to ask themselves the same type of questions. This would prove that they had acquired the most important characteristics of thinking—the independent use of a systematic and thoughtful approach. Here then, is the type of questions the adult facilitator could use:

1. What are your initial observations? (ascending order, multiples of five, etc.)

2. What is the relationship between the numbers in this set (what has happened to the first to produce the second, and so on)?

3. What theories do you have about the rule?

4. How do we test these? (How do we test "ascending order," "multiples of five," and so on?)

In time, the student should acquire the habit of asking his own guiding questions. When this occurs the instructional object of problem-solving activity will be satisfied. This is simply that the student acquires the attitudes and techniques necessary to discover answers to life's problems on his own; to move through life as a thoughtful person, less inclined to immediately assume that the butler did it, but to consider that as just one possibility worthy of examination.

Amiga Software Reviews/Baal

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at the pump and zapping the monster, you can generate enough lives to get through level one. Once you've got as many as you think you will need, you can save the game to disk so that you can always start the game with plenty of warriors. You'll need them.

If you do manage to get to the end of level one, you'll find a transporter to take you to the next level. You must have a minimum of ten War Machine parts collected to make the transporter work.

Baal has a short learning curve for the player interface, but it will take some time to map. The pause button comes in handy for this. It doesn't take long to get the hang of timing jumps over the mines and ledges, just make sure your joystick can articulate diagonals accurately, otherwise you're going to be blowing up and falling a lot.

Overall, I thought it was a good addition to the Psygnosis line; it's entertaining and challenging with good playability that will keep you raster-bound for quite some time.

**Also available in Commodore 64 and MS-DOS formats.*

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also specify the number of degrees, up to 360, through which to spin the outline. The extrude tool lets you create solid letters and other forms, like pushing Play-Doh™ through an opening in the desired shape. You can extrude a shape any number of times, turning, twisting and resizing as you go. Finally, the new Edge maker tool lets you connect any two vertices, whether or not they're selected.

There are two ways to make copies of existing objects. Add Duplicate creates an exact copy of a selected object, and Reflect makes a mirror copy. The latter command is useful for making animal and human shapes—just build the right or left half, then use Reflect to make it whole.

Other object creation commands include Expand, which lets you resize objects in any combination of the three dimensions, and Subdivide, which adds vertices along existing edges, allowing you to make objects more complex. It's a shame that Byte-by-Byte didn't see fit to include the related Fill command that lets you turn outlines into flat surfaces automatically. Naturally, there's also a variety of Erase commands for getting rid of those little mistakes.

There's relatively little choice available in the area of surface options for your objects—color is about it. There's no smoothing or other options. You can set any surface to be any of the Amiga's 4096 colors, but since the program doesn't render in HAM mode, if you use more than 32 colors (or 16 in high resolution), the program must make compromises. One new feature in the Color requester lets you "fetch" a selected object's color into the requester, or if the object contains more than one color, you can "blend" the colors into a single hue.

Other object editor commands let you set locations for the observer, target and any number of light sources, all of which can be mobile in animations, as well as camera focal length and exposure (manual or automatic). There's no focusing—everything's always sharp! You can also set colors for the sky and/or ground, as well as an ambient or overall light level. There's a choice of three image sizes: Medium, Full and Overscan. Medium fills a quarter of the screen, Full uses the standard full-screen resolution, and Overscan adds pixels to the picture's edges so that no border is visible. There are also three rendering modes: Wireframe, Sketch and Scanline. Wireframe shows all edges of all objects in the camera view, Sketch is a quick way to show solid objects in their true colors, while Scanline takes a bit longer but renders objects more accurately. Finally, the Status command shows available memory, both chip and fast, as well as the number of selected and unselected vertices, and the number of faces and edges, constantly updated at screen top. And of course, the Start command begins the rendering process, which ultimately displays the final image on the monitor screen. This image can be easily stored in a standard IFF format disk file.

> Since *Jr.* is a subset of *Sculpt–Animate 4D,* most descriptions here apply to the high-end product as well.

Animation

Sculpt–Animate 4D, Jr. offers only one form of animation, but it's a powerful one. Tweening animation is very easy to understand—position an object in a starting position in a frame, then in a subsequent position in a later frame, then let the computer draw all the intermediate positions! For example, you could position a human figure in a crouching position in frame one, then in a standing position in frame ten, and the computer will automatically calculate and create all of the in-between steps of the motion in frames two through nine. Or cause a stone building to transform into a fluttering butterfly—your imagination's the only limit!

Creating an animation in *Jr.* involves first specifying the length of your animation, which can be adjusted at any time, then indicating which frames are to be "key" frames—you'll need at least two, but there's no maximum limit. If you use many key frames, you'll need extra disk space, but animations will be smoother. If there are non-moving objects in the animation, you can save disk space by including them in the global scene, which is stored only once on disk.

"Take" is the term Byte-by-Byte uses for an animation setup. *Jr.*'s take requester is fairly extensive, offering choices for the location of the take's animation, object and image files. Since the latter two can be allocated on a frame-by-frame basis, the program does a good job of accommodating floppy-only systems. You can also have the program delete rendered frames as it goes in order to maximize disk space. A fast wire-frame preview is available, as is the choice of looping forward only, forward then backward, or not at all. You can also specify a time duration, in $\frac{1}{60}$ second intervals, for each frame. When rendering an animation, you can opt for fast compression with slower playback, or a slower compression time for optimum playback speed.

Unfortunately, you can't show animations from within the program—you must use the external Movie program supplied with *Jr.* If you have enough memory, you can use Amiga's multitasking to show an animation without exiting the program.

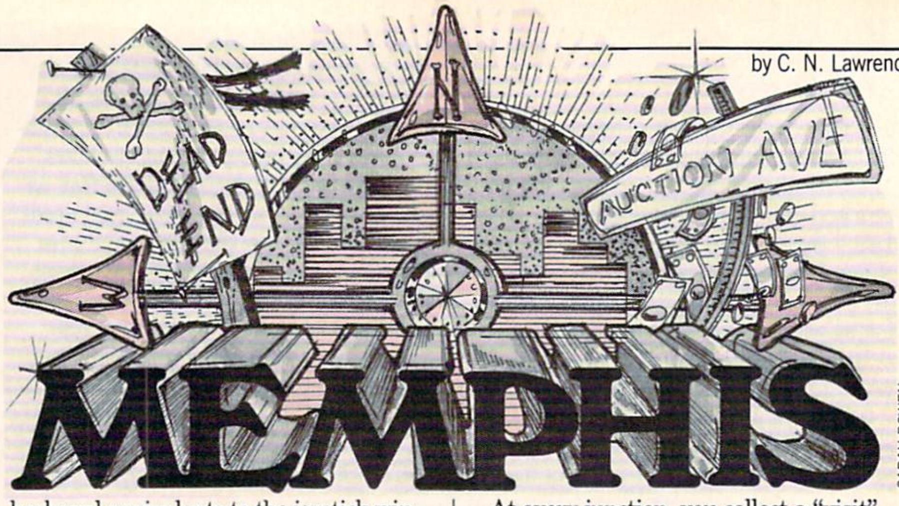
Summary

Although I've omitted mentioning a number of features here in order to save space, it's easy to see that this is a full-featured program. *Sculpt–Animate 4D, Jr.* is the product of years of experience designing 3D animation software, and looks it. It's well-designed, relatively easy to use considering its complexity, and thoroughly tested. If your budget is unlimited and you really need ray-tracing, get *Sculpt–Animate 4D*. But if you're just curious as to what all the hubbub is about, and would like to get a little hands-on 3D experience at minimal cost (in dollars as well as learning curve), consider *Sculpt–Animate 4D, Jr.* ■

by C. N. Lawrence

The Memphis Game

for the Commodore 128



SARAH BOWEN

The Memphis Game is an adventure-type game depicting a competition in which you must visit all but ten of the junctions in the Memphis and Shelby County, Tennessee area.

There are four programs that must be typed in. They are all written in BASIC. Type them in, and then save them to disk. Then load and run LOC.DATA and ROADS.CRE. This will create important data files on the disk.

To play, insert a joystick into either port (optional), switch to 80-column mode, and type RUN"MEMPHIS BOOT". It will then load Locations and Roads, and then run Memphis Game. **Important:** Do not run Memphis Game without running Memphis Boot! If you do, the program will not function correctly, and the game will not work.

After a while, the playing screen will come up. On the left is the Joystick Window, where, if you have a joystick, you move the flashing cursor to your option. If the choice is available, it will be in white. Otherwise, it will be in light gray. The keyboard equivalents to the joystick window options are:

N — N key or cursor up	GET — T key
S — S key or cursor down	END — Q key
E — E key or cursor right	GAS — G key
W — W key or cursor left	

The N, S, E and W options are for directions in the area. GET is to take any money you might find. END will abort the game. GAS is for purchasing gasoline. The dollars per unit ratio is displayed at the top of the input window. The current units on hand will also be displayed. You start the game with $100 and 19 units of gasoline. Your tank can only hold 50 units of gas at a time. If you run out of gas and there is no gas station at the junction you moved to, you are towed back to the start (which costs lots of money), where you must buy gas to continue.

At every junction, you collect a "visit" card if you have not already been there. The object of the game is to collect at least 104 visit cards. To win, you must return to the start of the game and "hand over" your visit cards before 24:00. Every time you move, it adds one minute to your tally. (Hint: Draw a map of everywhere you visit. This will help you in your quest.)

At the end of the game, you will score points for money remaining, gas remaining, and (if you complete the game) time remaining and Completion Bonus (1,000,000 points). It will then compare it to the high-score file on the disk and display the high score and player. After about three seconds, the program will ask if you wish to play again. If you press "N" then it will attempt to boot the disk. If unsuccessful, it will reset the computer. ■

Before typing this program, read "How to Enter Programs" and "How to Use the Magazine Entry Program." The BASIC programs in this magazine are available on disk from Loadstar, P.O. Box 30008, Shreveport, LA 71130-0007, 1-800-831-2694.

The Memphis Game

```
20 TRAP 1Ø5Ø'BEGY
3Ø DOPEN#2,"[SHFT H]IGH [SHFT S]CORE"
   :DCLOSE:IF DS THEN 4Ø:ELSE 5Ø'FOOJ
4Ø DOPEN#2,"[SHFT H]IGH [SHFT S]CORE",
   W:PRINT#2,Ø,"[SHFT C]OMMODORE 128"
   :DCLOSE:PRINT CHR$(14)'FSBO
5Ø X=RND(-TI/97):LA=114'FNMH
6Ø DIM C%(LA),F%(LA),D$(7),F(7),N,S,E,
   W,GA,GE,PT,PO,CA,G,R,L,JM'BGNP
7Ø FOR I=1 TO LA:C%(I)=.:NEXT'FMGI
8Ø FOR I=1 TO 12:A=INT(RND(1)*LA)+1
   :B=(RND(1)*1Ø)+1Ø:C%(A)=B:NEXT
   :WR=52684:SYS WR,8,11'QYBA
9Ø TC=2:BC=7:F%(34)=1:COLOR 6,BC'EUGM
1ØØ SCNCLR:CA=1ØØ:PT=2:G=19
   :WINDOW Ø,Ø,79,24,1'FCBE
11Ø GOSUB 31Ø:REM "[SHFT O]UTPUT"'CEVA
12Ø GOSUB 4ØØ:REM "[SHFT J]
   OYSTICK"'CEAB
13Ø L=1:D$(1)="[SHFT N]ORTH"
   :D$(2)="[SHFT S]OUTH"
   :D$(3)="[SHFT E]AST"
   :D$(4)="[SHFT W]EST"
   :D$(5)="[SHFT G]AS"
   :D$(6)="[SHFT T]AKE"
   :D$(7)="[SHFT Q]UIT"
   :R$(.)="[SHFT L]OOP":JM=1'KEWE
14Ø MV=1:TM$="ØØ:ØØ"'CHDD
15Ø GOSUB 12ØØ'BEEB
16Ø GOSUB 49Ø'BDQC
17Ø CHAR 1,Ø,12,">"'BHCE
18Ø GOSUB 56Ø'BDOE
19Ø REM'BARE
2ØØ D=PO:IF A$="[SHFT Q]
   "THEN 1Ø4Ø'EKYB
21Ø IF A$="[SHFT T]"AND C%(L)THEN
   CA=CA+C%(L):C%(L)=.:GOTO 15Ø'ICDI
22Ø IF A$="[SHFT G]"THEN GOSUB 78Ø
   :GOTO 15Ø'FJYD
23Ø CHAR 1,Ø,12,">"+D$(D):G=G-1
   :MV=MV+1:IF G<1 THEN 1Ø6Ø'JEGL
24Ø X=VAL(RIGHT$(TM$,2))
   :X1=VAL(MID$(TM$,2,1))
   :X2=VAL(LEFT$(TM$,1))'JLXO
25Ø X=X+1:IF X=6Ø THEN X=Ø:X1=X1+1
   :IF X1=1Ø THEN X2=X2+1:X1=Ø
   :IF X2=1Ø THEN 1Ø4Ø'RNVV
26Ø MID$(TM$,4)=RIGHT$("ØØ"+MID$(STR$
   (X),2),2):MID$(TM$,2)=CHR$(48+X1)
   :MID$(TM$,1)=CHR$(48+X2)'OVEW
```

```
270 IF MV>6039 THEN MV=6039:SCNCLR
    :PRINT"[SHFT Y]OU RAN OUT OF TIME"
    :PRINT"[SHFT Y]OUR SCORE IS AS
    FOLLOWS:":GC=0:GOTO 870'JXDC
280 PRINT:PRINT"[SHFT P]RESS [RVS]
    [SHFT E,SHFT S,SHFT C] [RVOFF]
     TO CHANGE MOVE, ANY OTHER TO
    CONTINUE":DO:GET A$
    :LOOP UNTIL A$<>""OR
    JOY(PT)=128'LPPG
290 IF F(D)=.OR A$=CHR$(27)THEN SCNCLR
    :G=G+1:GOTO 150'KTCP
300 L=F(D):SCNCLR:GOTO 150'DKIB
310 PRINT"[HOME2]";'BBYX
320 SCNCLR:PRINT CHR$(27)"M";'DGVC
323 REM EDITOR'S NOTE [LOWER CASE] =
    [CNTRL N]'BHPM
325 FOR Y=0 TO 24:COLOR 5,16
    :CHAR 1,0,Y,"[LOWER CASE]":NEXT
    :COLOR 5,TC'HWIN
330 Y=23:R=1:A$="[SHFT T]HE [SHFT M]
    EMPHIS [SHFT G]AME [SHFT V]
    ERSION 2.2:[SPACE9,SHFT C].
    [SHFT N]. [SHFT L]AWRENCE"
    :GOSUB 1170'EOFV
340 PRINT CHR$(27)"L";'CFLD
350 CHAR 1,20,1,"[CMDR A]",1
    :CHAR 1,75,1,"[CMDR S]",1
    :CHAR 1,20,18,"[CMDR Z]",1
    :CHAR 1,75,18,"[CMDR X]",1'EQSQ
360 FOR X=21 TO 74:CHAR 1,X,1,"
    [SHFT *]",1:CHAR 1,X,18,"[SHFT *]
    ",1:NEXT'GAUN
370 FOR Y=2 TO 17:CHAR 1,20,Y,"
    [SHFT -]",1:CHAR 1,75,Y,"[SHFT -]
    ",1:NEXT'GAAP
380 CHAR 1,21,1,"[SHFT I]NPUT/[SHFT O]
    UTPUT[RIGHT,SHFT W]INDOW",1'BJNO
390 WINDOW 21,2,74,17,1:RETURN'COPK
400 WINDOW 1,1,16,3,1:WINDOW 0,0,79,
    24'CWBE
410 CHAR 1,0,0,"[CMDR A]",1
    :CHAR 1,17,0,"[CMDR S]",1
    :CHAR 1,0,4,"[CMDR Z]",1
    :CHAR 1,17,4,"[CMDR X]",1'EMHM
420 FOR X=1 TO 16:CHAR 1,X,0,"[SHFT *]
    ",1:CHAR 1,X,4,"[SHFT *]",1
    :NEXT'GXMK
430 FOR Y=1 TO 3:CHAR 1,0,Y,"[SHFT -]
    ",1:CHAR 1,17,Y,"[SHFT -]",1
    :NEXT'GXXL
440 CHAR 1,1,0,"[SHFT J]OYSTICK[RIGHT,
    SHFT W]INDOW",1'BIWJ
450 CHAR 1,1,4,"[SHFT J]OYSTICK
    [RIGHT5]2",1'BITJ
460 COLOR 5,16:CHAR 1,4,1,"[SHFT N]"
    :CHAR 1,2,2,"[SHFT W] [WHITE]+
    [GRAY3] [SHFT E]":CHAR 1,4,3,"
    [SHFT S]"'EADQ
470 CHAR 1,10,1,"[SHFT G,SHFT E,
    SHFT T]":CHAR 1,10,2,"[SHFT E,
    SHFT N,SHFT D]":CHAR 1,10,3,"
    [SHFT G,SHFT A,SHFT S]"'DXHT
480 N=.:S=.:E=.:W=.:GE=.:GA=.
    :WINDOW 21,2,74,17:RETURN'IHJS
490 PRINT CHR$(146);:FF=N:GOSUB 550
    :PRINT"[HOME2]";:CHAR 1,4,1,"
    [SHFT N]":FF=S:GOSUB 550
    :CHAR 1,4,3,"[SHFT S]":FF=W
    :GOSUB 550:CHAR 1,2,2,"[SHFT W]"
    :FF=E:GOSUB 550:CHAR 1,6,2,"
    [SHFT E]"'PSMK
500 FF=GE:GOSUB 550:CHAR 1,10,1,"
    [SHFT G,SHFT E,SHFT T]":COLOR 5,2
    :CHAR 1,10,2,"[SHFT E,SHFT N,
    SHFT D]":FF=GA:GOSUB 550
    :CHAR 1,10,3,"[SHFT G,SHFT A,
    SHFT S]":COLOR 5,TC'JADX
510 CHAR 1,14,4,CHR$(PT+48),1'DPRF
520 CHAR 1,21,18:PRINT USING"[RVS,
    SHFT Y]OU[SHFT *]HAVE[SHFT *]
    $###.##[RVOFF]";CA'DLCL
530 CHAR 1,40,18,"[RVS,SHFT G]AS
    [SHFT *]"+RIGHT$("00"+MID$(STR$(G)
    ,2),2)+"[RVOFF]":CHAR 1,43,1,"
    [RVS,SHFT T]IME[SHFT *]"+TM$+"
    [RVOFF]":CHAR 1,48,18,"[SHFT M]
    OVE[SHFT *]"+RIGHT$("0000"+MID$
    (STR$(MV),2),4),1'QDVI
540 WINDOW 21,2,74,17:RETURN'CMDG
550 IF FF THEN COLOR 5,TC:RETURN
    :ELSE COLOR 5,16:RETURN'HNJL
560 FOR X=1 TO 7:IF F(X)=0 THEN NEXT
    :ELSE PO=X:X=8:NEXT'LRTQ
570 PRINT"[HOME2]";:COLOR 5,TC'CGTJ
580 GOSUB 490:PRINT"[HOME2]";'CFSJ
585 IF PO=1 THEN CHAR 1,4,1,"
    [FLASH ON,SHFT N,]",1
    :ELSE IF PO=2 THEN CHAR 1,4,3,"
    [FLASH ON,SHFT S,]",1
    :ELSE IF PO=3 THEN CHAR 1,6,2,"
    [FLASH ON,SHFT E,]",1
    :ELSE IF PO=4 THEN CHAR 1,2,2,"
    [FLASH ON,SHFT W,]",1'TWGQ
590 IF PO=5 THEN CHAR 1,10,3,"
    [FLASH ON,SHFT G,SHFT A,SHFT S,]",
    1:ELSE IF PO=6 THEN CHAR 1,10,1,"
    [FLASH ON,SHFT G,SHFT E,SHFT T,]",
    1:ELSE IF PO=7 THEN CHAR 1,10,2,"
    [FLASH ON,SHFT E,SHFT N,SHFT D,]",
    1'ONHJ
600 J=JOY(PT):GET A$:IF A$="[CMDR J]
    "THEN JM=0:A$="":GOTO 490'JVXL
610 IF A$="[CMDR P]"THEN BEGIN
    :IF PT=2 THEN PT=1:ELSE IF PT=1
    THEN PT=2:BEND'OTRQ
620 IF J THEN 680'CEAE
630 J=-1*(A$="[UP]")-3*(A$="[RIGHT]
    ")-5*(A$="[DOWN]")-7*(A$="[LEFT]
    ")-128*(A$=CHR$(32))-128*(A$=CHR$
    (13))'VSKB
640 J=J-1*(A$="8")-3*(A$="6")-5*
    (A$="2")-7*(A$="4")-128*(A$="5")
    'QEVV
650 A$=CHR$(ASC(A$)AND 127)
    :J=J-1*(A$="N")-3*(A$="E")-5*
    (A$="S")-7*(A$="W")'RJDY
660 IF A$="N"OR A$="S"OR A$="E"OR
    A$="W"THEN PO=1'KLVQ
```

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670 IF A$="T"THEN PO=6:ELSE IF
    A$="Q"THEN PO=7:ELSE IF
    A$="G"THEN PO=5'ORYV
675 IF A$="T"THEN J=1:ELSE IF
    A$="Q"THEN J=3:ELSE IF A$="5"THEN
    J=5'OOXA
680 IF J=.THEN 600:ELSE IF J=128 THEN
    BEGIN:A$=LEFT$(D$(PO),1)
    :IF F(PO)=.THEN 560:ELSE GOTO 490
    :BEND'QPLC
690 J=J AND 15'CEPL
700 GOSUB 490:PRINT"[HOME2]";'CFSD
710 IF PO>4 THEN 750'DGGF
720 IF J=1 AND F(1)THEN PO=1:GOTO 580
    :ELSE IF J=5 AND F(2)AND PO<>6
    THEN PO=2:GOTO 580:ELSE IF J=3
    AND F(3)AND PO<>3 THEN PO=3
    :GOTO 580:ELSE IF J=7 AND
    F(4)THEN PO=4:GOTO 580'ILQN
730 IF J=3 AND(PO=3 OR F(3)=0)THEN
    PO=7:GOTO 580'JTPO
740 GOTO 580'BDMG
750 IF J=7 AND F(3)THEN PO=3:GOTO 580
    :ELSE IF J=1 AND F(6)THEN PO=6
    :GOTO 580:ELSE IF J=3 THEN PO=7
    :GOTO 580:ELSE IF J=5 AND
    F(5)THEN PO=5:GOTO 580'BBOJ
760 IF J=7 AND F(4)THEN PO=3:GOTO 580
    :ELSE IF J=7 AND F(1)THEN PO=1
    :GOTO 580:ELSE IF J=7 AND
    F(2)THEN PO=2:GOTO 580'UQTE
770 GOTO 580'BDMJ
780 PRINT"[CLEAR]"USING"[SHFT Y]
    OU HAVE $###.##";CA
    :GS=INT((RND(1)*6)+22)/100'ITFX
790 PRINT USING"[SHFT G]
    ASOLINE COSTS $#.## PER UNIT";GS
    :PRINT USING"[SHFT Y]
    OU HAVE ## UNITS OF GASOLINE
    ALREADY.";G'EGDI
800 PRINT"[SHFT H]OW MANY UNITS
    :0[LEFT]";:OPEN 1,0:INPUT#1,L$
    :CLOSE 1:PRINT'FNVN
810 LT=VAL(L$):IF L=0 THEN RETURN
    :ELSE IF LT+G>50 THEN 780'LSJO
820 IF LT*GS>CA THEN 780'EJKI
830 CA=CA-(LT*GS):G=G+LT:RETURN'GQON
840 X=RWINDOW(1)/2-LEN(A$)/2:COLOR 5,C
    :CHAR 1,X,Y,A$,R:PRINT:RETURN'KDIT
850 D=RWINDOW(1):X=1:L=LEN(A$):DO
    :W$="":DO:L$=MID$(A$,X,1):W$=W$+L$
    :X=X+1'OQKB
855 LOOP UNTIL L$=" "OR X>L
    :PRINT CHR$((POS(.)+LEN(W$)>D)
    *-13);W$;:LOOP UNTIL X>L:PRINT
    :RETURN'SDRG
860 SCNCLR:A$="[SHFT Y]
    OU HAVE COMPLETED THE GAME
    IN"+STR$(MV)+" MOVES,
     AND YOU HAVE SCORED THE
    FOLLOWING...":GOSUB 850
    :GC=1000000'HVGM
870 PRINT USING"[SHFT C]
    ASH-ON-HAND #$#,###.##";CA
    :IF GC=0 THEN MV=6040'GNNV
880 PRINT USING"[SHFT G]AS REMAINING
    [SPACE8]## UNITS";G
    :CG=G*INT(6*RND(1)+22)/100'JRRC
890 PRINT USING"[SHFT C]ASH FOR GAS
    [SPACE4]#$##.##";CG:FC=CA+CG'EKJV
900 PRINT USING"[SHFT M]OVES MADE
    [SPACE8]#,###";MV:MC=6040-MV
    :SC=INT((MC*100)+(FC*100))'JGPV
910 PRINT USING"[SHFT C]OMPLETION
    [SPACE4]#,###,###";GC'CDDL
920 PRINT"[CMDR T24]":SC=SC+GC'DHSY
930 PRINT USING"[SHFT T]OTAL [SHFT S]
    CORE[SPACE2]##,###,###";SC
    :PRINT CHR$(27)"T";'EJTR
940 DOPEN#2,"[SHFT H]IGH [SHFT S]CORE"
    :INPUT#2,N$,HS:DCLOSE'DOLP
950 IF SC>HS THEN BEGIN
    :PRINT"[HOME,DOWN,SHFT O]LD
    [SHFT H]IGH [SHFT S]CORE:"HS
    :PRINT"[SHFT N]EW [SHFT H]IGH
    [SHFT S]CORE:"SC:INPUT"[HOME,
    SHFT P]LEASE ENTER YOUR NAME";N$
    :DCLOSE:SCRATCH"[SHFT H]IGH
    [SHFT S]CORE"'JSIP
960 DOPEN#2,"[SHFT H]IGH [SHFT S]CORE,
    S",W:PRINT#2,N$:PRINT#2,SC:HS=SC
    :DCLOSE:DCLEAR:BEND'HCPY
970 SCNCLR:GOSUB 490:PRINT"[DOWN9]";'DGRN
980 PRINT USING"[SHFT H]IGH [SHFT S]
    CORE[SPACE3]##,###,###";HS'CDJT
990 PRINT"BY ";N$'BDDO
1000 SLEEP 5:PRINT"[CLEAR,SHFT A]
     NOTHER [SHFT G]AME ([SHFT Y]ES/
     [SHFT N]O)? [FLASH ON,CMDR @,
     LEFT]"CHR$(143);'DJFG
1010 GET KEY A$:IF A$<>"[SHFT Y]
     "AND A$<>"Y"AND A$<>"[SHFT N]
     "AND A$<>"N"THEN 1010'PPAJ
1020 IF A$="[SHFT Y]"OR A$="Y"THEN
     PRINT"[SHFT Y]ES":SLEEP 1
     :RUN"MEMPHIS BOOT"
     :ELSE PRINT"[SHFT N]O":SLEEP 2
     :BOOT'MOMN
1030 SYS 65341'BFKW
1040 SCNCLR:A$="[SHFT Y]
     OU HAVE ABORTED THE GAME,
      AND PLAYED FOR"+STR$(MV)+"
     MOVES. [SHFT Y]OU HAVE SCORED
     THE FOLLOWING:":GOSUB 850:GC=0
     :GOTO 870'ITKD
1050 IF ER=30 THEN PRINT"?[SHFT B]
     REAK IN"EL:END:ELSE
     PRINT"?"CHR$(142)ERR$(ER)CHR$(14)
     "[SHFT E]RROR IN"EL
     :PRINT CHR$(142):HELP:END'OGTU
1060 PRINT"[CLEAR,SHFT Y]
     OU RAN OUT OF FUEL..."'BAUG
1070 PRINT"[SHFT P]RESS [RVS] [SHFT S,
     SHFT P,SHFT A,SHFT C,SHFT E]
     [RVOFF] OR [RVS] [SHFT F,SHFT I,
     SHFT R,SHFT E] [RVOFF]
      TO CONTINUE..."'BANQ
1080 DO:GET A$:LOOP UNTIL A$=" "OR
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     JOY(PT)=128'INSK
1090 IF F(5)THEN GOSUB 780
     :GOTO 150'ELFG
1100 PRINT"[SHFT Y]OU ARE TOWED BACK
     TO THE START FOR ";'BBJE
1110 XX=INT(RND(1)*20)+15
     :PRINT USING"#$#.##";XX'HPUE
1120 CA=CA-XX:IF CA<0 THEN PRINT"
     [SHFT Y]OU ARE ALSO
     BANKRUPT..."'GKGJ
1130 L=1:PRINT"[SHFT Y]
     OU ALSO WASTE 5 MOVES..."
     :MV=MV+5'EJHJ
1140 PRINT"[SHFT P]RESS [RVS] [SHFT S,
     SHFT P,SHFT A,SHFT C,SHFT E]
     [RVOFF] OR [RVS] [SHFT F,SHFT I,
     SHFT R,SHFT E] [RVOFF]
      TO CONTINUE..."'BANO
1150 DO:GET A$:LOOP UNTIL A$=" "OR
     JOY(PT)=128'INSI
1160 GOSUB 490:GOSUB 780:GOTO 150'DLHD
1170 X=RWINDOW(1)/2-LEN(A$)/2
     :CHAR 1,X,Y:IF R THEN PRINT
     CHR$(18);:ELSE PRINT CHR$(146);
     'OGPR
1180 PRINT A$"[LOWER CASE]";
     :RETURN'CEPE
1190 A$="MEMPHIS GAME":SCRATCH(A$)
     :DSAVE(A$):RUN "MEMPHIS
     BOOT"'ENBP
1200 GOSUB 490:FOR I=1 TO 5
     :F(I)=J%(L,I):NEXT:F%(L)=1'HCYF
1210 F(6)=C%(L):F(7)=1:SCNCLR'DQTB
1220 PRINT"[SHFT L]OCATION #"L'BBKB
1230 IF L=1 AND MV<>1 THEN BEGIN
     :PRINT"[SHFT C]HECKING IF GAME
     COMPLETED... [SHFT P]
     LEASE WAIT"'IHOQ
1240 Z=.:FOR X=1 TO 114
     :IF F%(X)=.THEN Z=Z+1'JSLJ
1250 NEXT:IF Z<10 THEN 860:ELSE ZL=L
     :A$="[SHFT Y]OU HAVE NOT
     COMPLETED THE GAME. [SHFT Y]
     OU REQUIRE"+STR$(Z-9)+" MORE
     VISITS.":GOSUB 850:L=ZL'NBHG
1260 BEND'BBXC
1270 PRINT:COLOR 5,TC:PRINT"[SHFT R]
     OAD"TAB(20)"[SHFT D]
     IRECTION"TAB(47)" [SHFT J]CT"
     :FOR I=1 TO 4:IF F(I)THEN BEGIN
     :R=J%(L,I+5):IF R>22 THEN
     R=R-1'SOGE
1280 PRINT R$(R)TAB(20)D$(I);:PUDEF"0"
     :PRINT TAB(47);:PRINT USING"[RVS]
      ### ";J%(L,I):PUDEF" ":BEND'JHVR
1285 NEXT'BAEI
1287 REM EDITOR'S NOTE [UNDERLINE ON]
      = [CNTRL B]'BJLU
1290 NG=0:COLOR 5,16:PRINT"[SHFT Y]
     OU CAN [UNDERLINE ON]
     NOT"CHR$(130)" GO ";:FOR I=1 TO 4
     :IF F(I)=.THEN PRINT D$(I)", ";
     :NG=NG+1:NEXT:ELSE NEXT'QOAC
1300 IF NG=0 THEN PRINT
     CHR$(27)"J"CHR$(27)"Q";
     :COLOR 5,TC:ELSE PRINT
     CHR$(20)CHR$(20):COLOR 5,TC'MGIL
1310 IF F(5)THEN PRINT"[SHFT Y]
     OU CAN GET GAS HERE."'DEGF
1320 GE=0:IF C%(L)THEN GE=1
     :PRINT USING"[SHFT T]
     HERE IS $##.## OF MONEY LAYING
     HERE.";C%(L)'GTXP
1330 N=.:IF F(1)THEN N=1'EJVD
1340 S=.:IF F(2)THEN S=1'EJHE
1350 E=.:IF F(3)THEN E=1'EJFF
1360 W=.:IF F(4)THEN W=1'EJRG
1370 GA=.:IF F(5)THEN GA=1'ELLI
1380 IF G<11 THEN BEGIN:CL=3'FIGJ
1390 COLOR 5,CL:PRINT CHR$(15)"***
     [SHFT F,SHFT U,SHFT E,SHFT L]
     [SHFT W,SHFT A,SHFT R,SHFT N,
     SHFT I,SHFT N,SHFT G] - [SHFT L,
     SHFT E,SHFT S2] [SHFT T,SHFT H,
     SHFT A,SHFT N] 1/5 [SHFT T,
     SHFT A,SHFT N,SHFT K]
      ***"+CHR$(7)'FMGH
1400 COLOR 5,TC:BEND'CGWA
1410 GOTO 490'BDMY
```

END

Memphis Boot

```
10 GRAPHIC 5,1:COLOR 6,7:COLOR 5,2
   :FAST'ENID
20 DIM J%(114,9),R$(51)'BQDB
30 BLOAD"[SHFT L]OCATIONS",B1,
   P(POINTER(J%(1,1)))'CSNH
40 DOPEN#2,"[SHFT R]OADS"
   :FOR I=1 TO 51:INPUT#2,R$(I):NEXT
   :DCLOSE'HUTK
50 DLOAD"MEMPHIS GAME"'BAVF
```

END

LOC.DATA

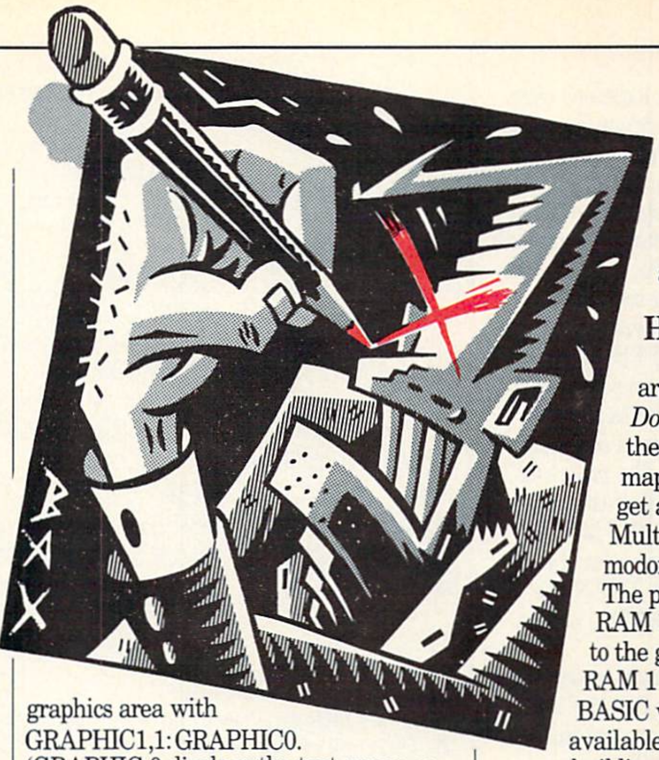
```
10 GOSUB 2150'BEJX
20 DIM J%(114,9):SCRATCH"[SHFT L]
   OCATIONS":FOR I=1 TO 114
   :FOR J=1 TO 9:READ J%(I,J):NEXT
   :NEXT'LFNO
30 BSAVE"[SHFT L]OCATIONS",B1,
   P(POINTER(J%(1,1)))TO
   P(POINTER(J%(114,9))+2)'FJRM
1000 DATA 0,2,48,0,1,0,2,1,0'BSMV
1010 DATA 0,107,47,1,0,0,2,3,2'BULX
1020 DATA 106,22,4,107,0,4,4,2,2'BWPY
1030 DATA 105,18,5,3,0,5,2,5,2'BUVA
1040 DATA 103,25,6,4,0,6,6,5,5'BUCB
1050 DATA 102,31,7,5,1,7,7,5,5'BUDC
1060 DATA 55,31,8,6,0,8,8,5,5'BTPD
1070 DATA 54,28,9,7,0,10,10,5,5'BVEE
1080 DATA 55,35,10,8,1,9,9,5,5'BUPF
1090 DATA 11,9,69,55,0,5,5,13,13'BWJG
1100 DATA 12,10,63,58,0,5,5,11,11'BXSX
1110 DATA 59,11,62,13,0,5,5,1,12'BWWY
1120 DATA 79,57,12,14,0,10,10,12,
     12'BAMB
1130 DATA 80,56,13,15,0,14,14,12,
     12'BANC
```

```
114Ø DATA 81,Ø,14,16,Ø,15,Ø,12,12'BXLC
115Ø DATA 82,11Ø,15,Ø,1,16,16,12,
     Ø'BYHE
116Ø DATA Ø,Ø,17,62,Ø,Ø,Ø,1,1'BTFE
117Ø DATA 4,2Ø,19,1Ø4,1,2,17,2,17'BXUF
118Ø DATA 18,19,Ø,Ø,Ø,2,2,Ø,Ø'BTKG
119Ø DATA 18,21,25,22,1,17,17,18,
     18'BABI
12ØØ DATA 2Ø,21,Ø,Ø,Ø,17,17,Ø,Ø'BVDY
121Ø DATA 3,24,2Ø,23,1,4,4,5Ø,5Ø'BWPA
122Ø DATA Ø,Ø,22,Ø,Ø,Ø,Ø,5Ø,Ø'BTBA
123Ø DATA 22,24,Ø,Ø,Ø,4,4,Ø,Ø'BTFC
124Ø DATA 5,Ø,26,2Ø,1,6,Ø,18,18'BVWD
125Ø DATA 31,Ø,27,25,1,8,Ø,18,18'BWCE
126Ø DATA 31,29,28,26,Ø,7,7,18,18'BXSF
127Ø DATA 8,29,32,27,1,1Ø,1Ø,18,
     18'BYZH
128Ø DATA 27,3Ø,28,Ø,Ø,7,7,1Ø,Ø'BVTH
129Ø DATA 29,3Ø,Ø,Ø,Ø,7,7,Ø,Ø'BTPI
13ØØ DATA 7,26,27,6,Ø,8,8,7,7'BTVA
131Ø DATA 35,Ø,33,28,1,19,Ø,18,18'BXGB
132Ø DATA 72,Ø,76,32,1,2Ø,Ø,18,18'BXBC
133Ø DATA Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø'BRVC
134Ø DATA 9,32,72,Ø,Ø,9,19,9,Ø'BUKE
135Ø DATA Ø,Ø,36,73,Ø,Ø,Ø,13,13'BVJF
136Ø DATA Ø,Ø,37,64,Ø,Ø,Ø,11,11'BVGG
137Ø DATA 9Ø,112,95,92,Ø,22,21,5,
     5'BYAI
138Ø DATA Ø,41,91,4Ø,Ø,Ø,5,5,25'BVSI
139Ø DATA 86,85,39,Ø,1,17,17,24,Ø'BXPJ
14ØØ DATA 39,42,114,84,Ø,5,5,21,
     21'BYXC
141Ø DATA 41,44,Ø,48,Ø,5,5,Ø,1'BUUC
142Ø DATA 45,1Ø4,1Ø9,Ø,Ø,7,17,7,Ø'BXYD
143Ø DATA 42,45,1Ø8,46,Ø,5,5,26,
     26'BYFF
144Ø DATA 44,1Ø5,43,46,Ø,5,5,7,7'BWKF
145Ø DATA 48,45,44,47,1,17,7,3,3'BWRG
146Ø DATA Ø,1Ø6,46,2,Ø,Ø,4,3,3'BUNH
147Ø DATA 49,46,42,1,Ø,17,17,1,1'BWDI
148Ø DATA Ø,48,85,86,Ø,Ø,17,17,27'BXRJ
149Ø DATA 11Ø,53,56,1Ø1,1,13,13,11,
     26'BCGL
15ØØ DATA 51,1ØØ,Ø,Ø,Ø,Ø,22,Ø,Ø'BVSC
151Ø DATA 52,99,Ø,Ø,Ø,Ø,17,Ø,Ø'BURD
152Ø DATA 56,7,54,5Ø,1,28,8,13,13'BXME
153Ø DATA 7Ø,8,55,53,1,1Ø,1Ø,13,
     13'BYPG
154Ø DATA 71,9,1Ø,54,Ø,19,9,13,13'BXHG
155Ø DATA 14,53,57,5Ø,Ø,14,28,11,
     11'BARI
156Ø DATA 13,54,58,56,Ø,1Ø,1Ø,11,
     11'BALJ
157Ø DATA 78,55,11,57,Ø,19,19,11,
     11'BAGK
158Ø DATA 92,12,6Ø,78,Ø,5,5,29,29'BXUK
159Ø DATA Ø,62,61,59,1,Ø,3Ø,29,29'BXIL
16ØØ DATA Ø,Ø,61,6Ø,Ø,Ø,Ø,Ø,29'BUID
161Ø DATA 6Ø,Ø,17,12,Ø,3Ø,Ø,1,1'BVEE
162Ø DATA Ø,67,64,11,Ø,Ø,31,11,11'BXLF
163Ø DATA Ø,65,37,63,Ø,Ø,32,11,11'BXRG
164Ø DATA 64,66,Ø,67,Ø,32,32,Ø,33'BXEH
165Ø DATA Ø,73,Ø,65,Ø,Ø,34,Ø,32'BVPI
166Ø DATA 63,Ø,68,71,Ø,31,Ø,33,33'BXAJ
167Ø DATA Ø,69,65,67,Ø,Ø,35,33,33'BXMK
168Ø DATA 68,72,73,1Ø,Ø,35,36,13,
     13'BACM
169Ø DATA 57,54,71,Ø,Ø,1Ø,1Ø,33,Ø'BXPM
17ØØ DATA 58,55,67,7Ø,Ø,19,19,33,
     33'BASF
171Ø DATA 69,33,77,35,1,2Ø,2Ø,9,9'BXTF
172Ø DATA 66,74,36,69,1,34,34,13,
     13'BANH
173Ø DATA 73,75,Ø,77,1,34,34,Ø,9'BWPH
174Ø DATA 74,Ø,Ø,76,1,34,Ø,Ø,18'BVXI
175Ø DATA 77,Ø,75,33,Ø,36,Ø,18,18'BXMJ
176Ø DATA Ø,76,74,72,Ø,Ø,36,9,9'BVRK
177Ø DATA Ø,58,59,94,Ø,Ø,19,29,29'BXAL
178Ø DATA Ø,13,94,8Ø,1,Ø,1Ø,29,29'BXCM
179Ø DATA Ø,14,79,81,1,Ø,14,29,29'BXLN
18ØØ DATA Ø,15,8Ø,111,Ø,Ø,15,29,
     29'BYQG
181Ø DATA 113,16,111,83,1,52,16,29,
     37'BCBH
182Ø DATA 114,1Ø8,82,84,Ø,38,38,37,
     37'BCSI
183Ø DATA Ø,83,41,85,Ø,Ø,37,21,21'BXXI
184Ø DATA 4Ø,Ø,84,49,1,17,Ø,21,17'BXCJ
185Ø DATA 87,4Ø,Ø,49,Ø,17,17,Ø,39'BXNK
186Ø DATA 93,86,88,Ø,Ø,17,17,4Ø,Ø'BXPL
187Ø DATA 93,91,89,87,Ø,41,41,4Ø,
     4Ø'BAPN
188Ø DATA Ø,92,9Ø,88,Ø,Ø,42,43,4Ø'BXGN
189Ø DATA 97,38,96,89,Ø,22,22,44,
     44'BABP
19ØØ DATA 88,Ø,92,39,Ø,41,Ø,5,5'BVLG
191Ø DATA 89,Ø,38,91,1,42,Ø,5,5'BVMH
192Ø DATA 99,87,88,Ø,1,17,17,41,Ø'BXYI
193Ø DATA 95,Ø,78,79,1,45,Ø,29,29'BXAK
194Ø DATA 96,94,59,38,1,46,45,5,5'BXGL
195Ø DATA 97,95,Ø,9Ø,1,46,46,Ø,44'BXVL
196Ø DATA 98,96,1ØØ,93,Ø,47,46,22,
     22'BBPN
197Ø DATA Ø,97,1ØØ,99,1,Ø,47,48,
     48'BYQO
198Ø DATA 52,93,98,Ø,1,17,17,48,Ø'BXSO
199Ø DATA 51,97,Ø,98,1,22,22,Ø,48'BXNP
2ØØØ DATA 11Ø,1Ø2,5Ø,1Ø8,Ø,16,16,26,
     26'BDLY
2Ø1Ø DATA 1Ø1,1Ø3,6,1Ø9,1,16,16,7,
     7'BATA
2Ø2Ø DATA 1Ø2,5,Ø,1Ø4,1,16,6,Ø,49'BXSA
2Ø3Ø DATA 43,18,1Ø3,1Ø5,Ø,17,17,49,
     49'BCHC
2Ø4Ø DATA 45,4,1Ø4,1Ø6,1,5,5,49,
     49'BYHD
2Ø5Ø DATA 47,3,1Ø5,1Ø7,Ø,4,4,49,
     49'BYHE
2Ø6Ø DATA 2,3,1Ø6,Ø,1,2,2,49,Ø'BUOE
2Ø7Ø DATA 83,1Ø9,1Ø1,44,1,38,38,26,
     26'BCJG
2Ø8Ø DATA 1Ø8,Ø,1Ø2,43,Ø,38,Ø,7,7'BXWG
2Ø9Ø DATA 16,1Ø2,5Ø,Ø,1,16,16,13,
     Ø'BYFI
21ØØ DATA 112,Ø,81,82,1,51,Ø,29,
     29'BYXA
211Ø DATA Ø,111,38,113,Ø,Ø,51,21,
     21'BAYB
212Ø DATA Ø,82,112,114,1,Ø,52,21,
     21'BACC
```

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by Richard Curcio

Do-it-Yourself Picture Conversion
for the Commodore 128



The Commodore 128 BASIC 7.0 commands make setting up and drawing on a bit-mapped display infinitely easier than was possible on its predecessor—except for the many drawing programs that are available for the Commodore 64. You may own one or more of these drawing programs. Perhaps you have created a masterpiece with one of them and would like to use it in a 128-mode game. Or maybe you'd like to touch-up a BASIC 7.0 created picture with a 64 graphics program. Or maybe you have a new favorite drawing program and would like to convert your older, and possibly unfinished, pictures for use with it.

Formats

There are as many formats for Commodore 64 picture files as there are graphics programs. Some save the pictures with the color map(s) followed by the bit-map. Others put the colors after the bit-map. (I will assume that you are familiar with the differences between hi-res and multi-color bit-mapping. For more information, consult the appropriate chapters of the Commodore 64 or 128 *Programmers Reference Guides*.) Some programs save the full 1024 or 8192 bytes of the color and bit maps, while others save only the needed 1000 or 8000 bytes. The accompanying chart shows the memory locations occupied by several graphics formats when loaded by a non-relocating BLOAD or LOAD "name", 8, 1.

Most graphic drawing programs include a BASIC program and/or machine-language routine for viewing the pictures outside of the main program. Often, these utilities provide information not mentioned in the instructions, such as the bit-map and color addresses, or how the picture names are handled.

Doodle! pictures are in standard high-resolution and are highly compatible with the Commodore 128 bit-map allocation. In fact, no conversion is needed. All that's needed is to load the picture to a different location than the one it was saved from. The BASIC 7.0 BLOAD command makes this easy. First, allocate and clear the graphics area with GRAPHIC1,1:GRAPHIC0. (GRAPHIC 0 displays the text screen so we can see what we're typing.) To bring a *Doodle!* into memory, simply type

BLOAD"DDname", B0, P7168

The B parameter ensures that the picture is loaded into RAM 0. If omitted, BLOAD uses the configuration established by the most recent BANK statement. The P parameter specifies the address where loading will start. The new address in this example is the start of the graphics area, the video matrix. After loading the picture, to view it issue a GRAPHIC1 command, or GRAPHIC2 so that you have a text area on which to see typed commands. What could be simpler?

There is one complication when using a *Doodle!* picture in a 128-mode game, and that is the sprite pointers. In text mode, eight locations at the end of text screen memory serve as pointers to the sprite shapes. In bit-map mode, the VIC chip looks to the end of the video matrix, which holds the hi-res colors, for the sprite pointers. When the hi-res screen is cleared, the default pointer values are written to the end of the video matrix. Loading a *Doodle!* picture in the manner described above will over-write these pointers. They can be copied from text screen memory to the video matrix in BASIC with BANK 15 (or BANK 0,) followed by FOR I=0 TO 7: POKE 8191 –I, PEEK (2047–I): NEXT. You can also use part of the ROM routine that clears the bit-map area: BANK 15: SYS 27469 This routine doesn't copy the pointers from the text screen memory, but instead writes the default pointer values to the video matrix. (This suggests some interesting possibilities concerning sprites, but that's a topic for another article.)

Hi-Res Converter

Not all picture formats are as easy to deal with as *Doodle!,* mainly because of the order in which the bit-map and colors are saved. To get around this difficulty, Multi-converter uses the Commodore 128 RAM 1 as a buffer. The pictures are loaded into RAM 1 and the data is moved to the graphics area in RAM 0. RAM 1 or BANK 1 is used for BASIC variables. With over 60K available, it's unlikely that strings, building from the top down, or numeric variables, building from the bottom up, will bump into the picture information.

To convert one picture format to another, the pieces of picture data must be put into the proper order, BSAVE'd with the proper starting and ending addresses, and any required characters included in the filename. Moving 9 or 10K of data from Bank to Bank takes a very long time in BASIC. In direct mode, the 128's Machine-Language Monitor Transfer command can very quickly move this much data from Bank to Bank. In a program, the "dynamic keyboard" feature of the 128 can simulate the typing of commands, but this quickly becomes quite clumsy when put into an "all-purpose" routine. (I tried it.) Multi-converter, therefore, includes a short machine-language memory-mover routine.

The heart of the conversion process is the memory-mover routine, contained in the data statements in lines 680–810. As listed, the ML is poked into location 4864 in RAM 0, but the routine is relocatable and can be placed into any free memory accessible in BANK 15. If MOVE is the starting location of the routine, it is accessed with

BANK 15: SYS MOVE, SB, DB,,, SA, EA, DA and Destination Banks, SA is the source Start Address, EA is the source End Address +1, and DA is the Destination start Address. The three intervening commas *must* be present. Unlike the MLM Transfer command, this is a "dumb" mover: If the source and destination are in

the same Bank, and their locations overlap, at some point the operation becomes an unintended memory Fill.

However, the routine is not totally dumb. If SB or DB is greater than 15, or EA is less than SA, the routine stops with ILLEGAL QUANTITY. Furthermore, if the number of bytes being moved should cause DA to "roll-over" or wrap from the end of memory (65535/$FFFF) to zero, the remaining bytes are not moved, preventing a certain system crash. (In this respect, the MLM Transfer isn't so smart.) In the event of a roll-over, the processor Carry bit will be set. To check that the move was complete, after SYS MOVE, read the processor status register into a variable with IF C AND 1 THEN the move was incomplete. C AND 1 will be zero for a successful move.

When run, Multi-converter presents a menu of operations. "View Picture" simply displays the current bit-map contents. Press any key to return to the menu. "Load Picture" brings up a selection of picture formats. Once that choice is made, the program knows what characters (if any) to attach to the filename, and where the information will be located after the picture is loaded. All pictures are loaded into RAM 1, even *Doodle!* pictures, which, as we saw earlier, could be loaded directly into the RAM 0 graphics area. When loading is completed, the program displays the bit-map and moves the information from RAM 1 to RAM 0 (in that order, because I like watching it happen).

"Save Picture" performs the converse operation, moving the current bit-map and colors into RAM 1, in the proper order for the format selected. Note that all pictures are saved from RAM 1, even BASIC 7.0 pictures, which could be saved as is from RAM 0. The 128 format was suggested by Morton Kevelson in the Aug/Sept 1986 *Commodore Power/Play*. In this format, three unused bytes of the video matrix hold the border and background colors and the graphic mode of the picture. The border color is stored in location 8168, the background (which isn't used in hi-res mode 1,) in 8169, and the mode in 8170. Note that the values in 8168/8169 are one less than BASIC's COLOR numbers. Since the full 1024 byte vid-mat is saved, the sprite pointers are also included in the file. Except for the start address and the picture name, pictures saved in 128 and *Doodle!* formats are identical, even though *Doodle!* doesn't use the border color or the sprite pointers.

The border color may be changed by pressing "5" while in the main menu or while the picture is displayed. The program can be exited at any time by pressing RUN/STOP. The program clears the bit-map only if the graphics area has not been allocated, so the current picture remains intact when the program is executed again. Pressing any invalid key during "Select Format" returns to the main menu, as will pressing RETURN without entering a picture name. The "Directory" operation can be paused with the NO SCROLL key, or aborted with RUN/STOP. The program will not END in that case. The BASIC 7.0 TRAP statement and the reserved variables ER, ERR$ and EL make this possible. Note that if the program is RENUMBERed, EL is not changed! You will have to manually change the line that *was* 1160 so that EL equals the number of the line containing the DIRECTORY command. The reserved variable DS is read after "Save Picture" and if any disk errors occurred, the drive status is displayed.

Picture Conversion Memory Location Table

Program	Bit Map	Video Matrix	Color Memory	Back-ground	Border	Start/End
Doodle!	24576 (8192)	23552 (1024)	——	——	——	23552/32767
Art Studio	8192 (8000)	16192 (1000)	——	——	17192	8192/17198*
Koala	24576 (8000)	32576 (1000)	33576 (1000)	34576	——	24576/34576
Advanced Art Studio	8192 (8000)	16192 (1000)	% 17208 (1000)	17193	17192	8192/18207
Micro Illustrator	8384 (8000)	6384 (1000)	7384 (1000)	——	——	6364/16383#
Sorcerer's Apprentice	8192 (8192)	16384 (1024)	17408 (1024)	18432	——	8192/18447*

* *Saves more bytes than needed.*
% *Sixteen-byte gap between end of vid. mat. and start of color mem.*
Starts with 20-byte header.
( ) *Number of bytes.*

Multi-Color Converter

This graphic mode allows more colors to appear on the screen at the expense of horizontal resolution. Another 1000 bytes (actually nybbles—half bytes,) destined for color memory at 55296 are included in multi-color picture files.

Graphic programs in this mode include *Koala Painter, Tech-Sketch Micro Illustrator* and *OCP Advanced Art Studio.* "Multi-Convert" will interconvert these multi-color files, as well as 128 format.

The Commodore 128 contains two 1K blocks of color RAM at the same address in Bank 15. Block 0 is used for multi-color bit-map colors (graphic modes 3 and 4,) and block 1 is used for the 40-column text screen colors. This allows the 128 to maintain independent text and graphic screens without having the colors interfere with each other.

This also creates a minor complication for the conversion process. In 128 mode, bit 1 of location 1 controls which color block is "seen" and therefore displayed by the VIC video interface controller. Bit 0 of that location determines which block is seen by the 8502 microprocessor. Location 1 is constantly being updated during the 128 interrupt. When a split-screen is in effect, an additional interrupt occurs to flip bit 1 so that VIC first displays the bit-map color RAM (if the mode is GRAPHIC4) and then the text colors, seemingly simultaneously.

Generally, the VIC raster interrupts should be disabled before switching color blocks. The subroutine in line 1320 disables raster interrupts by clearing bit 0 of VIC IRQ register at location 53274, and makes color Block 0 accessible with POKE 1, PEEK (1) AND 254. The subroutine in line 1350 switches back to text color block 1 with POKE 1, PEEK (1) OR 1. Raster interrupts are then enabled by setting bit 0 of 53274. The order of these

operations is important.

When *Koala* format is selected, the name-building routine in lines 644–648 attaches that troublesome first character to the filename. Despite appearances, this character is not a reverse spade or reverse capital "A", but is CHR$(129) — Commodore 1, the color orange. (This is why the program uses quotes around the name when displaying the "Searching for..." or "Saving..." messages. Without the quotes, printing a *Koala* name changes the text color. You may have encountered this in directory reading programs.) If the operation is Load, the wildcard "?" is used for the letter character of the *Koala* picture name. If the operation is Save, the letter "Z" is used, since DOS will not accept wildcards for Save.

The *Advanced Art Studio* name routine in lines 620–640 is fairly involved, and is borrowed from the *OCP* "Multiloader" program. Apparently, these steps are needed to eliminate unusual characters. There's nothing special about Commodore 128 names, and *Micro Illustrator* names begin with "PIC." Please note: Tech-Sketch's *Micro Illustrator* can save pictures in a compressed format. Multi-Converter will only work on pictures saved as raw data. Use "Binary Save" from *Micro Illustrator*'s Storage menu. On a disk directory, files in this format are 40 blocks long.

Compressed files are significantly shorter. Note also that *Micro Illustrator* always sets the background color to white. Pictures converted to this format will therefore lose their original background color. The 128 multi-color file format is, again, from the aforementioned Morton Kevelson article. A picture is saved as two files, one containing the bit-map and vidmat, and one containing color memory data. No special characters are used in the name of the bit/vid file, but the color memory filename is padded with spaces to a length of 13 characters and ".CM appended to the name. The border and background colors, and the graphic mode are stored in the same locations as the hi-res format. As in hi-res, the sprite pointers are saved as well. *Micro Illustrator* files gave me some trouble until I realized that they start with 20 bytes of data that somehow let the drawing program know whether the file is raw data or compressed. The routine to poke this information into RAM 1 before saving is contained in lines 1200–1240.

Numbering by ten, and numerous REMs, permit the inclusion of other picture formats. The steps to do so are not too difficult. For illustration, here's how to add Sorcerer's Apprentice to the multi-color converter: Consulting the chart, add the bit map, video matrix and color memory start addresses to the arrays:

```
878 BM(5)=1892:VM(5)16384
    :CM(5)=17408
```

Add the file start and end addresses:

```
924 SA(5)=1892:EA(5)=18447
    :REM SORCERER SAVES MORE
    BYTES THAN NEEDED...
```

(In the unlikely event that more than ten formats are needed, the arrays should first be DIMensioned.) Add a PRINT statement to the "Select Format" routine:

```
563 PRINT,"5.SORCERER"
```

Increase the comparison value in line 290 so it reads

```
290 GOSUB 550:IF F$<"1"OR
    F$>"5"THEN 160
```

Add routines to perform any extra steps after/before load/save:

```
1006 BANK 1:BG=PEEK(18432):BD=0
     :GOTO 1004:REM GET
     BACKGROUND,BORDER AFTER LOAD
```

```
1054 GOSUB 940:BANK 1
     :POKE 18432,BG:RETURN
     :REM BACKGROUND BYTE TO RAM
     1 BEFORE SAVE
```

Add these two routines to the appropriate ON-GOSUB statements:

```
390 ON F GOSUB 980,990,1000,1002,
    1006:REM POST LOAD EXTRAS
    :REM PRE-SAVE EXTRAS...
```

and one more to build the picture name:

```
320 ON F GOSUB 610,620,642,644,
    610
```

And that's it!

Various "frills" can also be added to these programs. Expanding on the error handling in lines 1160–1180, the program(s) wouldn't have to eND when encountering FILE NOT FOUND or RUN/STOP. A "Quit" option could then be added to the main menu for escape. The "Directory" option can be made selective, displaying only filenames of a selected format. Add the features you feel you need.

Before typing this program, read "How to Enter Programs" and "How to Use the Magazine Entry Program." The BASIC programs in this magazine are available on disk from Loadstar, P.O. Box 30008, Shreveport, LA 71130-0007, 1-800-831-2694.

Multi-Converter 128

```
100 TRAP 1160'BEIV
110 REM TEST FOR 80 COLS.'BOYA
120 IF RGR(0)=5 THEN PRINT
    CHR$(15)"*** 40 COLUMNS ONLY ***"
    :PRINT CHR$(27)"X"'INCK
130 REM TEST GRAPHICS AREA,
     CLEAR ONE TIME'BEUG
140 IF PEEK(118)=0 THEN GRAPHIC 3,
    1'FJVE
150 FAST:GOSUB 680:GOSUB 850:SLOW'ELXF
152 CT=RCLR(0):REM TEXT
    BACKGROUND'DUHJ
160 GRAPHIC 0:PRINT"[HOME2]
    "CHR$(12)'DGEE
162 COLOR 0,CT'BERE
170 PRINT"[CLEAR,DOWN,RIGHT7]
    MULTI-COLOR VIEW & CONVERT"'BAGL
180 PRINT,"[DOWN,RIGHT4,RVS]MAIN MENU
    [DOWN]"'BBNG
190 PRINT,"[DOWN]1. VIEW PICTURE"
    :PRINT,"[DOWN]2. LOAD PICTURE"
    :PRINT,"[DOWN]3. SAVE PICTURE"
    :PRINT,"[DOWN]4. DIRECTORY"
    :PRINT,"[DOWN]5. BORDER"'FJIB
200 REM'BARV
210 GET KEY K$:K=VAL(K$)'EIVB
220 ON K GOTO 250,290,290,520,
    1080'CVPD
230 GOTO 210'BDCA
```

```
240 REM'BARA
250 GOSUB 940:COLOR 4,BD+1
    :GRAPHIC 3'ELLG
252 COLOR 0,BG+1'CFQF
260 GOSUB 1110:GOTO 160'CITE
270 REM'BARD
280 REM GET FORMAT AND PIX NAME'BTDK
290 GOSUB 550:IF F$<"1"OR F$>"4"THEN
    160'GLUL
300 P$="":GOSUB 600:IF P$=""THEN
    160'FMVC
310 F=VAL(F$)'CFTA
320 ON F GOSUB 610,620,642,644'CQFD
330 IF K=3 THEN 420:REM DO SAVE'EMFF
340 PRINT"[DOWN]SEARCHING FOR
    "CHR$(34)A$CHR$(34)'DKLI
350 BLOAD(A$),B1,P(SA(F))'BRQG
360 GRAPHIC 3:REM MOVE PIX DATA'CNCI
370 BANK 15:SYS MOVE,1,0,,,BM(F),
    BM(F)+8000,BM(1)'DLQN
380 SYS MOVE,1,0,,,VM(F),VM(F)+1000,
    VM(1)'CHJN
382 GOSUB 1320:REM SWITCH COLOR
    BLOCKS'CWRO
384 IF F=1 THEN GOSUB 1270
    :GOTO 388'FKYO
386 SYS MOVE,1,15,,,CM(F),CM(F)+1000,
    CM(1)'CIGT
388 GOSUB 1350'BEKO
390 ON F GOSUB 980,990,1000,1002'CSYK
400 GOTO 250'BDGY
410 REM'BARY
420 PRINT"[DOWN]CONTINUE? (Y/N)"
    :GET KEY C$:IF C$<>"Y"THEN
    160'HJGL
430 BANK 15:SYS MOVE,0,1,,,BM(1),
    BM(1)+8000,BM(F):REM MOVE
    BIT-MAP'EXXO
440 SYS MOVE,0,1,,,VM(1),VM(1)+1000,
    VM(F):REM MOVE VID MAT'DSEO
442 IF F=1 THEN 450'DFSG
444 GOSUB 1320'BEHH
446 SYS MOVE,15,1,,,CM(1),CM(1)+1000,
    CM(F):REM MOVE COLOR MEM'DVEU
448 GOSUB 1350'BEKL
450 ON F GOSUB 1030,1050,1200,
    1052'CUCH
460 PRINT"[DOWN]SAVING
    "CHR$(34)A$CHR$(34)'DKAJ
470 BSAVE(A$),B1,P(SA(F))TO
    P(EA(F)+1)'DBBM
480 IF DS>19 THEN PRINT"[DOWN] "DS$
    :GOTO 530'FLUL
482 IF F=1 THEN 492'DFYK
490 GOTO 160'BDGI
492 GOSUB 1320:GOSUB 1270'CJCL
494 GOSUB 1350:GOTO 160'CIAN
500 REM'BARY
510 REM'BARA
520 WINDOW 7,0,33,24,1:DIRECTORY'CNIF
530 PRINT"[RIGHT2,RVS]PRESS ANY KEY
    FOR MENU";:GET KEY K$
    :GOTO 160'EIAM
540 REM'BARD
550 PRINT"[CLEAR,DOWN]","[RVS]
    SELECT FORMAT"'BBXJ
560 PRINT,"[DOWN]1. MULTI-COLOR C-128"
    :PRINT,"[DOWN]2. ADVANCED ART
    STUDIO"'CDKR
562 PRINT,"[DOWN]3. MICRO ILLUSTRATOR"
    :PRINT,"[DOWN]4. KOALA"'CDEQ
570 REM'BARG
580 GET KEY F$:RETURN'DDDJ
590 REM'BARI
600 INPUT"[DOWN,RVS]PICTURE NAME
    [RVOFF]";P$:RETURN'CEAG
610 A$=LEFT$(P$,16):RETURN
    :REM C-128'EQKG
620 SP$="[SPACE18]":B$=""'CGLH
630 A$=LEFT$(P$+SP$,12)+"MPIC"
    :REM ART STUDIO'FWDN
632 FOR I=1 TO 16:A=ASC(MID$(A$,I,
    1))'GQCM
634 IF(A>=192)AND(A<=223)THEN
    A=A-96'JQCQ
636 B$=B$+CHR$(A):NEXT'EIKN
638 A$=B$'BEYM
640 RETURN'BAQE
642 A$="PIC."+LEFT$(P$,12):RETURN
    :REM MICRO ILLUS'FVBP
644 N$=CHR$(129)+"PIC ? "
    :P$=P$+"[SPACE11]"'FMPQ
646 IF K=3 THEN N$="[ORANGE]
    "+"PIC Z "'FESQ
648 A$=N$+LEFT$(P$,8):RETURN
    :REM KOALA'FRDT
650 REM'BARF
660 REM'BARG
670 REM MOVER ML'BHBJ
680 MOVE=4864:BANK 15:FOR I=0 TO 94
    :READ D:POKE MOVE+I,D:NEXT'JDEU
690 RETURN'BAQJ
700 DATA 201,16,144,3,76,40,125,
    224'BBAG
710 DATA 16,176,249,133,206,32,107,
    255'BEJI
720 DATA 133,207,166,206,32,107,255,
    133'BFAJ
730 DATA 206,32,15,136,132,172,133,
    173'BEWK
740 DATA 32,15,136,132,174,133,175,
    32'BDFK
750 DATA 183,238,240,216,176,214,32,
    15'BEFM
760 DATA 136,132,195,133,196,169,172,
    141'BGPN
770 DATA 170,2,169,195,141,185,2,
    160'BCNN
780 DATA 0,166,206,32,162,2,166,
    207'BBEO
790 DATA 32,175,2,32,193,238,32,
    183'BBNP
800 DATA 238,240,10,230,195,208,234,
    230'BFUI
810 DATA 196,208,230,56,96,24,96'BXJI
820 REM'BARE
830 REM ADDRESS ARRAYS'BNCJ
840 REM BIT-MAPS AND VID. MAT'BSUL
850 BM(1)=8192:VM(1)=7168
```

```
      :REM C-128'DAGO
852  CM(1)=55296:REM COLOR MEM'CTUO
860  BM(2)=8192:VM(2)=BM(2)+8000
      :REM ADV. ART STUDIO'ENPT
862  CM(2)=VM(2)+16+1000'DQCP
870  BM(3)=8384:VM(3)=6384
      :REM MICRO ILLUS'DFES
872  CM(3)=7384'BJFN
874  BM(4)=24576:VM(4)=32576
      :REM KOALA'DCAV
876  CM(4)=33576'BKGR
880  REM'BARK
890  REM START AND END'BLXO
900  SA(1)=7168:EA(1)=16383
      :REM C-128'DBGK
910  SA(2)=8192:EA(2)=18207
      :REM ART STUDIO'DFCN
920  SA(3)=6364:EA(3)=16383
      :REM MICRO ILLUS'DGYO
922  SA(4)=BM(4):EA(4)=34576
      :REM KOALA'DCQP
930  REM'BARG
940  BANK 15:BD=PEEK(8168)AND 15
      :BG=PEEK(8169)AND 15:RETURN
      :REM BORDER & BACKGND'JQUW
950  REM'BARI
960  REM EXTRA STEPS AFTER LOADING'BWSQ
970  REM'BARK
980  BANK 15:SYS MOVE,1,0,,,8168,8192,
      8168:RETURN:REM C-128 BD, BG,
      MODE & PNTRS'ECMA
990  BANK 1:BD=PEEK(17192)AND 15
      :BG=PEEK(17193)AND 15:GOTO 1004
      :REM ART STUDIO'JQDC
1000 BD=0:BG=1:GOTO 1004
      :REM MICRO ILLUS'EXWB
1002 BANK 1:BD=0:BG=PEEK(34576)AND 15
      :REM KOALA BORDER & BACKGND'GNTI
1004 BANK 15:POKE 8168,BD:POKE 8169,BG
      :POKE 8170,3:RETURN'FCEF
1010 REM'BART
1020 REM EXTRA STEPS BEFORE
      SAVING'BWDC
1030 POKE 8170,3:REM C-128'CMDY
1040 SYS MOVE,0,1,,,8168,8192,
      VM(F)+1000:RETURN:REM COPY
      SPRITE PNTRS, BD, BG & MODE'EIPN
1050 GOSUB 940:BANK 1:POKE 17192,BD
      :POKE 17193,BG:RETURN
      :REM ART STUDIO BORDER &
      BACKGND'GYVN
1052 GOSUB 940:BANK 1:POKE 34576,BG
      :RETURN:REM KOALA BACKGND'FEHK
1060 REM'BARY
1070 REM'BARA
1080 BANK 15:GOSUB 1120:K=VAL(K$)
      :GOTO 220'FSEI
1090 REM BORDER SUBROUTINE'BQRH
1100 POKE 8168,BD:COLOR 4,BD+1'DNCY
1110 GET KEY K$'CCJW
1120 IF K$<>"5"THEN RETURN'FCAY
1130 BD=BD+1:IF BD>15 THEN BD=0'GNKE
1140 GOTO 1100'BEYY
1150 REM'BARY
1160 IF ER=30 AND EL=520 THEN RESUME
      NEXT'HJPG
1170 PRINT"[DOWN]"ERR$(ER)" IN"EL'CGYE
1178 COLOR 0,CT'BERK
1180 GRAPHIC 0:BANK 15:END'DGDF
1190 REM'BARD
1200 RESTORE 1220:BANK 1:FOR I=0 TO 19
      :READ D$:POKE 6364+I,DEC(D$):NEXT
      :RETURN'LDTH
1210 REM MICRO ILLUS PREAMBLE'BSRB
1220 DATA FF,80,69,67,14,00,01,E8'BXQC
1230 DATA 03,E8,03,40,1F,01,00,28'BXAD
1240 DATA 00,C8,00,00'BLLB
1250 REM'BARA
1260 REM LOAD/SAVE COLOR MEMORY
      FILE'BYHI
1270 SP$="[SPACE16]":A$=LEFT$(P$+SP$,
      13)+".CM"'FQTL
1280 IF K=3 THEN 1300'DGMG
1290 BLOAD(A$),B15,P55296:RETURN'CRGI
1300 BSAVE(A$),B15,P55296 TO P56319
      :RETURN'DXBC
1310 REM'BARW
1320 POKE 53274,PEEK(53274)AND 254
      :REM DISABLE IRQ'ECKG
1330 POKE 1,PEEK(1)AND 254
      :REM SWITCH COLOR BLOCKS'EBOI
1340 RETURN'BAQA
1350 POKE 1,PEEK(1)OR 1'DGZE
1360 POKE 53274,PEEK(53274)OR 1
      :REM ENABLE IRQ'EYDK
1370 RETURN'BAQD
```

END

Amiga Update/The HDTV Battle

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- In 1987, color TV production in the U.S. contributed $18.1 billion to the economy.

Regardless of what occurs in the political arena, an HDTV production standard already exists. HDTV cameras, VTR's and other production hardware are being manufactured and used. That standard uses 1125 lines, a 60 field signal, and a 16:9 aspect ratio. Regardless of what distribution standards are finally adopted, this is very likely to remain the only production standard. It is possible to convert from this standard to virtually all of the other HDTV standards being considered today, but it seems that economies of scale would favor a single production, transmission, distribution and reception standard wherever possible.

It also seems likely that we have a long wait ahead of us. If you want an improved television image today, you have several options available. Consider getting one of the new IDTV systems. They offer the best image you can get now. Make sure that you feed it the best signal you can find, whether that comes in off-the-air, through a cable or from a videotape player or videodisc player. If you make your own tapes, or rent, consider getting one of the new S-VHS or Hi8 videotape recorders. Although rental tapes in either format are virtually non-existent today, that should change in the future. Investigate adding an MTS stereo decoder to your TV if it will accept one. Broadcast stereo is still nowhere as good as compact disc, but it's better than mono. If you can't afford a new TV, but own a VCR, its tuner may be better than the one on your TV. Compare the image you get using your VCR's tuner. HDTV may still be a dream on the horizon, but better TV is not.

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On level one you should be able to rescue all the hostages and reach the exit with 80–90 seconds left on the clock.

One head runs off screen in one direction (stay out of its way!) and the other stays behind to fight. You must destroy the remaining head before time runs out to advance to the next level.

Between rounds a screen shows four different colonies in progressively worse states of infestation, which represent game levels. As you complete each level, the corresponding colony is shown as being bombed out. When you begin a new level, a digitized voice informs you that the time bomb has been set and the seconds begin to tick off.

The second level features new scenery, a different floor plan, and a new crop of monsters. The ones on level two look like escapees from a radioactive sushi bar, and they now fire small projectiles. These aliens seem to be easier to kill, but this is offset by an asymmetrical, harder-to-memorize floor plan, blobs which generate aliens, and ventilator shafts to fall down. Zapping the blobs will cut down on the aliens' rate of proliferation and should give you an advantage. Bonus score panels, weapons and droids are also found on level two.

Alien Syndrome looks like, and plays like, an authentic arcade game and will keep you coming back the way a well-designed game should. Though simple, there is enough challenge to make things interesting at every level, numerous opportunities to formulate strategy, and plenty of fast-paced action that the discriminating arcade gamer requires. ■

Splattering Aliens

1. Take a moment to draw a *quick* sketch of the map when you enter a new level. This will speed up memorization. Memorizing the shape of the floor plan will better equip you to formulate your own strategies.

2. Find out and memorize where the nearest more effective weapon is, and get to it while rescuing hostages on the way. Then pick up a droid and your favorite weapon. If you see any bonus panels on the way pick them up too.

3. Travel along diagonals wherever possible. It saves time.

4. Fire continually in a radial spray pattern as you move. Many times you will blast aliens as they come on screen. As you gain proficiency, you can be more selective about fire control.

5. "Looping" to avoid aliens lets you turn and fire more safely and allows you to escape from spores more easily. If you have a droid, this places the droid between you and the alien momentarily, and the droid generally shoots the alien at that point.

6. When facing the Super Alien on level one, always fire horizontally from one position until all the "tadpoles" are shot before changing positions, unless you are about to be hit by a projectile. This will help you survive, and gives you an opportunity to find a place to score on the Alien.

7. When you destroy the Super Alien move to another part of the screen as it breaks up to avoid the smaller head. After the smaller head is on its way out, immediately position yourself to blast the other head before its horns start to grow.

64 and 128 Software Reviews/Navy Seal

Continued from page 15

can draw blood and attract sharks, enemy frogmen (who are particularly troublesome), anti-personnel mines, and surface patrol boats with concussion grenades. The currents are constantly changing, so consult your compass frequently to stay on course. The last two digits on the compass show distance from the target.

The graphics during the underwater infiltration sequences are notable. You see a representation of the seabed with rapidly scrolling bands of color which change to suggest ambient aquatic light conditions. This is put to good use in the "Loch Ness" scenario which requires a high-intensity underwater searchlight. Instead of seeing the entire screen at once, you can see only the features illuminated by the searchlights' beam. The visual effect is about what you would expect to see in low-light conditions underwater.

If you survive the infiltration phases of the missions (which is no mean feat), you proceed to the target phase. This part of the game involves a task that must be completed within a certain time frame using the close-up function. For example, in the "Godzilla" scenario, you begin the target phase by climbing from the water up a ladder to a dock being guarded by soldiers with machine guns. The object is to get past the guards by eliminating them. Make one false move and you get drilled. The results can be gory or hilarious depending on how you play the scene.

Once past the guards, you find yourself in the enemy munitions depot, ready to set your demolition charges. Here, you advance along a row of concrete bunkers and machinery. At certain intervals, you can retreat into the background to avoid detection or set charges. Use the proper weapon and you can ambush patrols before they have a chance to fire on you and alert other guards. When you have set your last charge, the area is shelled with mortar rounds, so you must dive for cover and fight enemy soldiers at the same time.

If you make it out alive, a screen appears depicting the depot blowing up, as the diver watches the festivities some miles off shore.

Navy SEAL takes some practice, but once you get going, the game is absorbing. The underwater sequences are challenging, and the graphics have the peculiar effect of seeming more realistic the more you play. A careful reading of the manual is necessary for any degree of success; it is fairly well written and includes a four-page historical section which is interesting and informative.

Classified Commando Tips for SEAL Operatives:

- During the land training phase, keep moving; when you fire at the targets use the shortest bursts possible.

- When dodging mortar rounds, dive as soon as you hear the incoming sound. Once the SEAL sprite has begun to dive, stand up. The entire process takes only a moment, and you will see the half-track lose ground.

- During the infiltration phases, dodge divers, mines, sharks and Barracudas with a circular motion of the joystick. The hazard will either pass by completely, or, in the case of enemy divers, you can shoot them with your speargun. Don't forget to check your compass afterwards. Even though the manual warns that disabled divers alert patrol boats, I got the farthest along by "eliminating" as many of the hostile forces as possible. Firing a speargun shaft in the right direction once in a while can take out an enemy diver before he gets to the screen. ■

Amiga Software Reviews/Street Cat

Continued from page 26

from one platform, you have to make sure that your arc will take you past the necessary shape on the strip and will land you on the other platform. To do this successfully takes time. After you get the move down, you'll have time to consider earning bonus points by doing somersaults in the middle of some of your high-jumps.

"The Underground Sewer" is the third and most graphically detailed event. You again have to make your way past obstacles to clear the screen. These obstacles include lights, barrels, rats, bottom pipes, overhead pipes, ladders and mad dog. This obstacle event is easier than the first, but still has some of those left-and-right movement problems. When you jump on a barrel on one screen, you have to quickly move the joystick left and right or you'll fall off. You also have to do the same thing on the overhead pipes. When you fall off the pipes or barrel, it is very frustrating. Fortunately, these stumbling blocks are easier than the similar obstacles in the first event. You'll be breezing past the mad dog in the sewer in no time. There is also a "radar" view at the bottom to help you out.

The last event is "The Bowling Pub." In it, you must roll balls down one of six lanes to knock over the bulldog at the other end of the lanes. At the same time, he is trying to knock you over. The catch to the event is that the lanes are not straight. In two places across the lanes are boxes. As a ball enters a black box, it comes out in a different lane. As it leaves the next box, it comes out in yet another lane. Thankfully, there is a window at the bottom of the screen that shows by colored lines where each ball will come out after it enters a box in the lane. As time wears on, the lines disappear, so you have to remember where each ball will go so that you can aim balls at the bulldog and avoid his balls at the same time. If you do get hit, you have to walk up to the bar and get a milkshake. As you get more milkshakes, you get slower and clumsier (the game's equivalent of getting tipsy). If you have to drink six milkshakes before the timer runs down, you're history.

As far as scoring goes in *Street Cat,* don't expect to get any score unless you finish an event before the timer runs out or get bonus points at any time in the game. You get points for time remaining on the clock, for finesse in your moves (I still don't know what this means) and for any bonus points you earned in an event. In order to earn the first two, you have to finish the event. You always keep your bonus points. You get bonus points when you perform certain moves flawlessly in an event. When you do so, the hands on the left side of the screen clap and some bonus balls fall. At the end of an event or when the timer runs out, your bonus balls are tallied and you get 100 points for each one. Any flashing disks you touch in the interlude screen also earn you bonus balls.

Graphically, *Street Cat* is beautiful. The colors are well-chosen and the detail in the characters, backgrounds and obstacles is amazing. I was really happy with the game play. The amount of time spent on making the game as aesthetically pleasing as possible is appreciated. The sound effects also complement the game and credit is due for the splashes, howls, meows, bounces and music that permeate the game. From the looks of it, U.S. Gold plans on putting together other themed events games *(Sports-A-Roni* is one). If they are anything like *Street Cat,* you can expect them to be exciting. If they'd make some of the moves less awkward in similar games, things would be great. Until then, stay out of the water and watch out for those bulldogs. ■

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```
100 PRINT"[CLEAR,RVS,SPACE2]
    THE MONEY MACHINE - R. GREGORY
    SHAW[SPACE3]"
110 PRINT"[DOWN] PLEASE ENTER YOUR
    ACCOUNT NUMBER":PRINT"[DOWN] ";
120 GET NU$:IF NU$=""THEN 120
130 IF AC$="00"THEN 160
140 PRINT"X";:AC$=AC$+NU$
    :IF LEN(AC$)>2 THEN AC$=AC$+"$"
    :GOTO 180
150 GOTO 120
160 INPUT"[CLEAR,DOWN} ENTER YOUR
    NAME";NA$
170 INPUT"[CLEAR,DOWN] ENTER 3-DIGIT
    #";AC$:AC$=AC$+"$":BA=0:GOTO 350
180 OPEN 2,8,2,"0:"+AC$+",S,R"
190 INPUT#2,NA$,BA
200 PRINT:PRINT"[DOWN] *** *** *** ***
210 PRINT"[DOWN] "NA$:PRINT"[DOWN]
     CURRENT BALANCE: [RVS]$"BA
    :CLOSE 2
220 PRINT"[DOWN] *** *** *** ***
230 PRINT"[DOWN] [RVS]1[RVOFF] EXIT"
    :PRINT"[DOWN] [RVS]2[RVOFF]
     MAKE DEPOSIT
240 PRINT"[DOWN] [RVS]3[RVOFF]
     MAKE WITHDRAWAL
250 GET CO:IF CO=0 THEN 250
260 ON CO GOTO 270,280,300
270 END
280 INPUT"[CLEAR,DOWN] AMOUNT OF
    DEPOSIT";DE
290 BA=BA+DE:GOTO 320
300 INPUT"[CLEAR,DOWN] AMOUNT OF
    WITHDRAWAL";WI
310 BA=BA-WI
320 INPUT"[DOWN] [RVS]ENTER CHANGE
    CODE[BLUE]";CC$:PRINT"[CLEAR,
    L. BLUE]
330 IF CC$<>"151"THEN END
340 PRINT"[DOWN] NEW BALANCE
    : $[RVS]"BA
350 OPEN 2,8,2,"@0:"+AC$+",S,W"
360 PRINT#2,NA$:PRINT#2,BA:CLOSE 2
    :GOTO 220
```

Fractions: This will add, subtract, multiply and divide fractions. The answer is reduced to its simplest form and is returned as a fraction, not a decimal number.

The program is self-explanatory to anyone who knows about fractions. In case your fraction knowledge is only a fraction of what it once was, be advised that the numerator is the top number of the fraction, while the denominator is the bottom number.

A good way to keep them straight is to remember that "d" is for "down" and "denominator." (There's also a "u" in "up" and in "numerator."

When subtracting, fraction #2 is subtracted from fraction #1. When dividing, fraction #1 is divided by fraction #2.

Wayne S. Ellis
Bryantville, MA

```
100 PRINT"[CLEAR,RVS,SPACE7]
    FRACTIONS - WAYNE S. ELLIS[SPACE7]
    "
110 FOR L=1 TO 2:PRINT"[DOWN,SPACE2]
    NUMERATOR OF FRACTION #";L;
    :INPUT A(L)
120 PRINT"[DOWN]DENOMINATOR OF
    FRACTION #";L;:INPUT B(L):NEXT
130 INPUT"[DOWN,SPACE2]
    WHAT OPERATION ( + - * / )";Q$
140 F=B(1)*B(2):IF Q$=CHR$(42) THEN
    E=A(1)*A(2):GOTO 190
150 IF Q$=CHR$(43)THEN
    E=A(1)*B(2)+A(2)*B(1):GOTO 190
160 IF Q$=CHR$(45)THEN
    E=A(1)*B(2)-A(2)*B(1):GOTO 190
170 IF Q$=CHR$(47) THEN E=A(1)*B(2)
    :F=B(1)*A(2):GOTO 190
180 GOTO 120
190 PRINT"[DOWN]THE PROBLEM IS:":PRINT
    :PRINT A(1)"/"B(1)" "Q$"
    "A(2)"/"B(2)
200 PRINT"[DOWN]AND THE ANSWER IS
    :[DOWN]"
210 IF E=0 THEN PRINT "0":END
220 IF E<0 THEN E=ABS(E):J=1
230 IF E=F AND J=0 THEN PRINT "1":END
240 IF E=F AND J=1 THEN PRINT "-1":END
250 IF E>F THEN G=INT(E/F):E=E-F*G
    :GOSUB 390
260 N=E:M=F
270 M=M-N
280 IF (M-N)=0 THEN V=E/M:Z=F/M
    :GOTO 340
290 IF (M-N)>0 THEN 270
300 N=N-M
310 IF (N-M)<0 THEN 270
320 IF (N-M)>0 THEN 300
330 V=E/N:Z=F/N
340 IF G=0 AND J=0 THEN PRINT V;"/";Z
    :END
350 IF J=0 AND G>0 THEN PRINT G;" ";V;
    "/";Z
360 IF G=0 AND J=1 THEN PRINT "-";V;
    "/";Z
370 IF J=1 AND G>0 THEN PRINT "-";G;
    " ";V;"/";Z
380 END
390 IF E=0 AND J=0 THEN PRINT G:END
400 IF J=1 AND E=0 THEN PRINT "-";G
    :END
410 RETURN
```

Star Search: This will keep you informed on the changing features of the nighttime sky. Enter the number and day of the current month, plus the hour of viewing (in Eastern Standard Time).

The program will give you the position of the Big Dipper and Cassiopeia, plus a list of some other major constellations in the sky. If you have access to an atlas of star maps, the information on Hours Right Ascension will indicate which map to use.

Unfortunately, the program does not know if it's night or day at the hour you're interested in. This is the one place you know you're smarter than your computer.

R. Gregory Shaw
Fayetteville, NC

```
100 PRINT"[CLEAR,RVS,SPACE5]
    STAR SEARCH - R. GREGORY SHAW
    [SPACE6]"
110 INPUT"ENTER MONTH (1-12)";MN
    :INPUT"[SPACE2]ENTER DAY (1-31)";DY
120 MR=2*MN+6:IF DY>15 THEN MR=MR+1
130 IF MR>23 THEN MR=MR-24
140 INPUT" ENTER HOUR (1-24)";HR
    :HR=HR-1:RA=MR+HR:PRINT
    :IF RA>23 THEN RA=RA-24
150 PRINT RA;"HOURS RIGHT ASCENSION
    LIES ON THE":PRINT"NORTH-SOUTH
    MERIDIAN"
160 PO=ABS(-12+((RA-11)/2))
    :IF PO>12 THEN PO=PO-12
170 PRINT"[DOWN]FACING NORTH,
     BIG DIPPER'S POINTERS"
    :PRINT"ARE AT";PO;"O'CLOCK
180 CA=PO-5:IF CA=<0 THEN CA=CA+12
190 PRINT"[DOWN]CASSIOPEIA IS AT";CA;
    "O'CLOCK":PRINT"[DOWN]
    MAJOR CONSTELLATIONS:[DOWN]
200 IF PO>=10 OR PO<1 THEN 230
210 DT=16:IF PO>=4 THEN DT=10
    :IF PO>=7 THEN DT=4
220 FOR CN=1 TO DT:READ CN$:NEXT
230 READ CN$:IF CN$="Q" THEN 250
240 PRINT"[SPACE2]"CN$:GOTO 230
250 END
260 DATA BOOTES,GEMINI,VIRGO,Q,CYGNUS,
    BOOTES,LYRA,AQUILA,SCORPIUS,Q
270 DATA CYGNUS,AURIGA,LYRA,PEGASUS,
    PISCIS AUSTRINUS,Q
280 DATA ORION,CANIS MAJOR,GEMINI,
    AURIGA,CANIS MINOR,
    TAURUS & PLEIADES,Q
```

128 Morse Quiz: By testing your skill and speed with Morse code, this 128-only program helps you improve them. When it sends a letter, your job is to type that letter on the keyboard. The computer will tell you if you were right, and will show the time you took to answer.

As printed, the program's Morse vocabulary is limited to letters and numbers. If you want to add punctuation marks or other characters, add a DATA statement to the end of the program. The character goes first, then a comma, then the Morse code in dots (periods) and dashes. For each character you have added, add one number to the 36 in line 120. If you add five characters, for example, change the 36 to 41.

Scott Stonehouse
Corner Brook, Newfoundland
Canada

```
100 PRINT"[CLEAR,RVS,SPACE3]
    128 MORSE QUIZ - SCOTT STONEHOUSE
    [SPACE4]":PRINT
110 NUM=1
120 NUM=INT(RND(0)*36)
130 FOR T=1 TO NUM:READ LT$:READ CODE$
    :NEXT
140 VOL 15
150 FOR T=1 TO LEN(CODE$)
    :BEEP$=MID$(CODE$,T,1)
160 IF BEEP$="."THEN SOUND 1,20000,4
170 IF BEEP$="-"THEN SOUND 1,20000,12
180 SOUND 1,0,4
190 NEXT
200 TI$="000000":INPUT"LETTER";AN$
210 PRINT"REACTION TIME="(TI/60)
220 IF AN$=LT$THEN PRINT"RIGHT"
    :SLEEP 5
230 IF AN$<>LT$THEN PRINT"LETTER WAS
    "LT$ :SLEEP 5
240 RUN 110
250 DATA A,.-,B,-...,C,-.-.,D,-..,E,.,
    F,..-.,G,--.,H,....,I,..,J,.---,K,
    -.-
260 DATA L,.-..,M,--,N,-.,O,---,P,
    .--.,Q,--.-,R,.-.
270 DATA S,...,T,-,U,..-,V,...-,W,.--,
    X,-..-,Y,-.--,Z,--..
280 DATA 1,.----,2,..---,3,...--,4,
    ....-,5,.....,6,-....,7,--...,8,
    ---..
290 DATA 9,----.,0,-----
```

The Final Cartridge III: If you don't have a joystick plugged in, you can still move around the desktop. Use the F1–F3 keys to control your cursor, and use the COMMODORE key to select.

Robbie Stuff
Address Unknown

Label Your Joystick Plug: Put a piece of colored tape on the bottom side of your joystick plug. When plugging it in, you'll always know which end is up.

Glen Young
Renton, WA

Gold Mine

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MISL Soccer: Here's how to stockpile trading points. At the end of the season, before starting the new year, save the game. Keep saving it to get extra trading points; you get more each time you save it.

On the negative side, the players will age a year each time you save the game. I only do it when I want to stockpile the maximum of 9999 trading points.

You can also save trading points by saving the team to disk after a trade. This way you won't lose trading points or arbitration. If the trade is unsuccessful, turn off the computer and reboot.

Eric Owens
Watertown, NY

Moebius: Always get your charms blessed by a Good Monk before you go to the next plane.

On the Plane of Air, listen for the Minstrel playing his tune. When you hear it, activate a paralysis charm and find him. Go to him as if to communicate, then stop magic and communicate with him. If you have the Amulet on the first time you do this, you get the Werecharm, restoration of your body and mind, and some experience. After that, or if you aren't wearing the Amulet, you just get the restorations and the experience.

When traveling outside, always have your sword equipped, but listen for sinister chanting. If you hear it, keep a sharp eye out for an evil monk. When you see him, be careful. Put your

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sword away before fighting him, especially if the sword has been blessed.
Stephen E. Mynhier
Mauldin, SC

Neuromancer: You can obtain 50,000 credits from Armitage and Bank of Geimeinshaft and Hosaka Corp. You do not need a Cyberspace deck to obtain it. Use PAX to get 10,000 credits from Armitage.

You should save the game often, particularly once you have started exploration of cyberspace and have obtained skill increases and software.
Robert Unglaub
West Lafayette, IN

O'Riley's Mine: To get 100 lives, load the game, use your reset button, then enter these lines:

```
POKE 4965,100
SYS 3840
```

Mauricio de Brito Maciel
Rio de Janiero, Brazil

Paradroid: When you start the game, go to the level with the lowest number of droids. Transfer with a one, then a two, and so on. If you transfer with the 999 Master Droid, immediately go to another level and transfer with a lesser droid. Transfer with 999 is very short-lived.
Jason D'Aprile
Salem, WV

Popeye: If you want to get rid of Bluto on the first level, here is an easy way to do it. Power up with the spinach, and send him flying through the air. While he is still in the air, run to the first platform in front of the barrel. When his flight carries him close to the barrel, punch it and make it land on him. He will freeze in the air for the rest of the round. Timing is essential for this technique to work.
Biju Abrahams
Bayshore, NY

Power at Sea: At the beginning, load as many bombers as possible onto your ship. Then attack with only bombers, using as many as possible to increase the chance of a hit.

When attacking a ship, get close and dive bomb until your sights turn white. Drop a bomb and pull back immediately. I've never missed using this method.
Carl Lenocker
Sacramento, CA

Questprobe I: To beat the Lizard, you have to knock him out. To beat Hydro-Man, you have to freeze him. To beat Sandman, just don't walk into the room and disturb his sand.
Michael Denman
Katy, TX

Questprobe Hulk: I know just how frustrating it is when you can't get past the second room (the tunnel) in the dome. From the first room, type Bite Lip to get out of the chair. Go east into the tunnel and push the button. When you hear Time Delay On, Bite Lip again. This time you will get one move before gas fills the room. Type Go Outside and you're out! You can now move about freely as the Hulk.
Steven Gabaris
Flushing, NY

Rocket Ranger: First, you should fly out to the zeppelin and rescue the girl. Then go back to the war room and get the reports from your men. The object in the war room is to move your men around and around until you've infiltrated almost every country. Make sure that you use *every* hint your men give you.
Tom Thompson
Ankeny, IA

Satan's Hollow: The castle has east and west sides. You start on the west. When you build the bridge across to the east side, you see a fast-moving demon that shoots things at you. The easiest way to destroy him is to stay in the same position and wait for him to show up, then fire about six shots as soon as you see him. He'll fly around and run into one of your shots, especially if you have double and triple power.

The same trick sometimes works on the west side with the fire-breathing demon.
Denny Verhoff
Ottawa, OH

Sinbad and the Throne of the Falcon: Explore the entire first island, since three people you need to talk to are always there. Be kind to the Gypsy and ask about her health. The shaman will always be on Chustakis, Zatti or the Agnis land forms.

Don't retreat while swordfighting unless you absolutely have to; you'll lose something valuable for completing the game. When you find a gem, take it while it is red.
Steve Schaefer
Shavertown, PA

Superstar Ice Hockey: When your opponent scores a goal, immediately check as many of his men as you can. If the referee calls a penalty, the goal will be disallowed! You'll spend some time in the penalty box, but that's a small price to pay for saving a goal.
James Quirk
Lynbrook, NY

Tai-Pan: If you're having trouble getting started, try this. After receiving 300,000, bet a lot on the tiles until you have enough to succeed.
Lance Gater
Trenton, NJ

Test Drive: To change the high scores in this game, use your disk editor on side 2 of the diskette, track 1, sector 1. Never use an editor on your original disk; always use a backup.
James A. Garbarsky
Brooklyn, NY

Transformers: To save points, send all the Autobots to Pipeline Junction. Viewscreen Rodimus Prime and shoot at the last pipeline on the right. It will go down after several hits.

When the Decepticons attack the Space Shuttle Base, Dinosaur Park, Andreas Zoo or Pipeline Junction, use the Autobot Hot Rod. He's strong enough to destroy a Decepticon with one hit.

To get more points, shoot any Decepticon that has plutonium bars, a black laser or glowing comet dust. After the cargo is dropped, stay with it and blast anything that gets close to it.
Vinson Espinoza
Albany, GA

Ultima V: At the game's start, get as many people as possible into your party. This will let you kill monsters more easily, since you get more hits per round. Don't worry about getting poor characters, as you can always drop them off at an inn.

During your game, devote yourself to once again becoming a true and absolute Avatar. It takes a lot of quest completing for shrines, and a lot of gold before being prepared to face your destiny.

If you're in need of gold but are not strong enough to explore the underworld, try dungeon Covetous. It has crypts guarded by weak creatures and contains generous treasures. The word of power for this dungeon is *Avidus*.

Whatever you do, make sure you have the Sandalwood Box before you adventure beyond the vast darkness. It is a matter of finishing the game or turning back to retrieve it and adventuring all over again. To get the Sandalwood Box, play the music of stones which Lord Kenneth teaches you in the lighthouse south of Trinsic. Play this music on the harpsichord in Lord British's private chamber in the castle. You should know what to do from there.

When you're in a dungeon room that appears to be a dead end, fire a missile weapon at all walls. This may cause a secret passage to appear, and your room will no longer be a dead end.

You can search moongate sites when the moongate is not active. You might find a moonstone. Moonstones can come in handy when retrieving the Shards from the underworld without an eighth circle mage in your party.

To rid Britannia of a Shadowlord, yell the Shadowlord's name at the respective flame while on its south side. Then use the Shard when the Shadowlord is exactly on the flame. He then will be no more.
Danny Morrow
Ashland, OR

Ultimate Wizard: To see something funny, let the wizard make a jump. When he's in the air, pause the game with the STOP key. Press the STOP key again to continue the game, and you'll see him going up again!

Be careful with this trick, or you might lose your wizard.
Carlos J. Centeno
Lares, Puerto Rico

War in the South Pacific: Tired of your task forces being sighted and sunk by enemy bombers? Whenever a task force is spotted, initiate the order phase. Then use the Divide routine and transfer all that task force's ships to a new task force number.

During the execution phase, any planned strikes against the spotted task force will not be executed, since that task force has ceased to exist.

This tactic effectively negates enemy airpower, and works with either human or computer opponents. It will not protect your forces in a surface engagement.

A word of caution: It's likely that your new task force will also be spotted, so be prepared to initiate the orders phase again. Also, the number of active task forces is limited, so you should transfer your most valuable ships first.
Mike Cleveland & Joe Roper
Ramstein Air Base, Germany

Wasteland: When you return from a healing trip to the desert, the other members of your party will also be healed! If you leave for the trip when any of your characters are worse off than unconscious, they will be dead when you return.

In the Needles checkerboard game, move north 1, west 4 (to the wall), north 2, east 5, south 1, east 2 (to the wall), north 4, west 2, south 1, west 4, north 2 and east 2. The correct number of steps is 30.
Bill Balcom
East Wenatchee, WA

Who Framed Roger Rabbit: To avoid the puddles on the road, jump to the top of the buildings. Then all you have to worry about is running into taller buildings. Even so, you only get slowed down if you crash.

If you get to the Ink and Paint Club, watch the gorilla at the bottom. He will bounce you if you get too close.

Finally, don't let Roger pick up a drink. If you do, he'll go crazy for a while.
Eric Majeski
Burgettstown, PA

Wizardry I & II: If your group is mostly evil, avoid leaving friendly groups of monsters, as this may cause one of your members to become good. This is very annoying if that member is about to become a Ninja.
Kris Pivin
Napanoch, NY

Zak McKracken: Here's how to get the Blue Crystal and meet Annie. Fly Zak to Seattle, and have him pick up the tree branch. Give the peanuts to the two-headed squirrel. Use the tree branch with the loose dirt by the tunnel. Walk in the door, and use the tree branch with the birds' nest at the top of the screen. Use the birds' nest in the fire pit. Use the tree branch in the fire pit. Use the lighter on the branch and the nest.

If you don't have a lighter, it's coming. Walk to the yellow markings next to the right wall. Use yellow crayon on strange markings. Walk in the door, then use remote control. Pick up the Blue Crystal.

Back in San Francisco, walk to the bus. Move the cursor on top of the screen and hit the button. Go to Fourteenth Avenue and use the Blue Crystal in the slot in the second door.

You get three important items on the plane, including the lighter. Go to the bathroom. Use the toilet paper in the sink, then turn on the sink. Push the call button, and get out of there! Walk to the room where the waitress was. Wait until you hear a click, then go to the microwave. Open microwave. Use egg in microwave. Turn on microwave, then go back to your seat.

Wait until the stewardess says "Oh, no!" Walk to the empty seat, pick up its cushion and the lighter that fell. Open all the bins. Pick up the item that looks like a vacuum cleaner.

Here's how to pull a fast one on the store owner. Buy the tool kit and open it, noticing all the stuff you get. Without closing the kit, sell it. You get to keep its contents.
Sal Castiglione
Sayville, NY

Data East's Great Expectations

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Lloyd explained, "Our contract with ABC Sports to launch the new Data East MVP Sports line is another example of how the company is looking to build solid, long-term relationships that will enhance the quality and appeal of our game titles."

Whims commented on the same subject: "By launching into other categories with strong quality-driven product that makes us stand out from all the clutter out there, we hope to be successful."

Data East at the Movies

Yet another direction in which Data East will be heading is the heavy use of licensing deals to bring characters and other popular concepts to the video game, computer game, arcade game and pinball markets. Already, Data East has capitalized on a licensing agreement with *Robocop*. The deal also indicates how Data East plans to introduce original ideas in all markets at approximately the same time. This will help to reduce the tendency to think of Data East as a company that translates their hit arcade games to the home market. Beaumont explained, "In reality, *Robocop* was developed concurrently in the arcade, on Nintendo and in computer software. It was as much intended to be a consumer product as a coin-op product when we started working on it."

By playing around with the idea of introducing a licensed product simultaneously to all markets, Data East will almost be forced to make better games that will work in all segments of the industry. If *Robocop* is any example of future endeavors, we can expect other titles that will be just as successful and fun to play.

Even better timing helped Data East's *Batman* release. The game came out before the hit movie, which contributed to increased sales after the movie was released. As Lloyd revealed, "*Batman* represents Data East's move to secure licensing rights for 'high-profile' titles (*Platoon* and *Robocop* are two other examples) and developing games that incorporate state-of-the-art graphics and technology around those proven, hit themes."

An area that Data East hasn't fully tapped yet is the Amiga market. They are sitting on a gold mine if the translations turn out as well as the Commodore 64 versions did and if the original ideas that are introduced on the Amiga are as good as an arcade game would be. Again, *Platoon* was a good example of what they can do with the Amiga. I only hope that they continue in this vein. (*Batman* is another scheduled Amiga title.)

An area that doesn't have much pertinence to computer software, but is important to game players in general, is pinball. Data East Pinball expects to introduce some machines that I can't wait to see. In particular, *ABC Sports Monday Night Football*, *Phantom of the Opera* and *Robocop* should all be hits in the arcade. More importantly, Data East is developing the *Playboy 35th Anniversary* pinball machine, using graphics of Hugh Hefner and bunnies in the backglass and on the playfield to liven up the game. This project should be very successful judging by how well the original *Playboy* pinball game did in the arcades.

> "This isn't NASA or brain surgery. It's toys and games and fun for the kids. And if it's fun for them, it's got to be fun for the rest of us too. That's why we're in it."
>
> —Whims

So, with Data East heading in all these different directions, you might ask if they're spreading themselves a little thin. I really don't think so. Their track record has proven that they can handle any changes to their company. Data East survived the industry slump in the mid-'80's, so they can handle the extra work load. Ultimately, the company will continue to do the same number of arcade translations to the home market and increase the number of original titles in different categories. That will only help Data East.

Lloyd intimated what the company's future might hold: "I'm looking forward to broadening and strengthening the scope of Data East's entertainment titles—from developing new product lines for the recreational software market to securing more licensing agreements for action arcade and home entertainment game hits."

"It's Got to be Fun"

Jim Whims sums up his feelings about Data East, "There will always be a video game business. It's a proven form of entertainment that's been around for a long, long time. I think that down the road the computer will have more multiple uses and that the new technology (like CD-ROM) will give people a reason to buy computers. What we're attempting to do now is, with the success we've had both in the arcade business and the Nintendo business, work real hard to broaden our base in the computer software business. In the long-term we see that market as one that's got an awful lot of potential and one that we want to play in as a broad-based entertainment company, not just as an arcade company.

"We're really trying to help this whole business mature and develop so that we can compete with the Electronic Arts and the Mediagenics and some of the other big players in this business. Even though we are a larger company than they are, corporately, we can still learn a lot from them and hope to really be able to give them a run for the money in the very near future."

All I can say in response to that is that if Data East keeps up what they've been doing so far and follows through their plan to introduce original titles in different categories of software, then Whims' predictions may come true.

I started off this story not knowing much about Data East, and I came out with a greater understanding of the company and their vision. What it all comes down to is whether the game players and buyers like what they produce. You can have the most advanced technology in the world in a game or the best licensing deal and, if the game is not any good, it might flop. So far, nothing that Data East has produced for the home market has flopped. The quality has remained consistent throughout and, if anything, has gotten better.

If it sounds like I'm tooting Data East's proverbial horn throughout this article, it's because I've got nothing but praise for them so far. I'm just a gamer like the rest of you. My philosophy is simple—I like the current offering of Data East games and look forward to their future releases. As Whims said: "This isn't NASA or brain surgery. It's toys and games and fun for the kids. And if it's fun for them, it's got to be fun for the rest of us too. That's why we're in it."

You hit it right on the nose, Jim. That's why we're all in it.

Thanks go out to Connie Freeman, Jim Whims and Mark Beaumont for talking to me and to Bob Lloyd for answering my questions. Special thanks go out to Laurie Thornton of Neale-May & Partners, whose hard work in arranging the interviews gave me the information to do this story.

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from under the hat and lifts it, revealing a rabbit wearing a bow tie and a tuxedo with tails. Who needs a magician? This rabbit can pull himself out of a hat!

"To create the stage," she explains, "I designed three different sizes of floorboards and put them together like a panelled wall. Then I grabbed the wall as a brush, tilted it back using the perspective feature in *Photon Paint* and stamped it down to make the stage floor. To make the stage look like the back of it was in shadow, I set the color blend to be dark at the back of the stage and stamped it back down on itself. To make the stage curtains, I wrapped a tube with the dithering set very high to create the illusion of a fold of material. To create the shadows between the folds, I used a horizontal blend over a black background so that the fold of the curtain would be black at the back of the fold and full color at the front. Then by putting three different sizes of these curtain folds next to each other at random, I created a stage curtain with nice realistic shadows between the folds. Then all I had to do to add a final touch of realism was to paint the scallop of the bottoms of the curtains by hand."

Once the background was set, Heidi colored in the rabbit. She says, "I originally did him with a maroon tuxedo, but the maroon bled a little when recorded on videotape, so I just changed his tuxedo to green with a few simple strokes of the trackball. With traditional methods, I would have had to order fresh cels and start over, but with the Amiga, it was easy to just assign a new color to him.

"Another nice feature of *Photon Paint* is the ability to do a freehand fill with blending, so I can do a freehand outline over the digitized lines of my character. The line becomes a deeper shade of the fill color which makes a very nice colored in character instead of just doing a flood fill up to a black line. I used that when I was doing the Viking on the galloping horse so that the lines on his chest are a deeper flesh color and the lines around the horse became a deeper shade of the chestnut orange I used. Since *Photon Paint* is a 4096-color HAM paint program, that creates some very nice shades. Now Dan Silva added Extra-Halfbrite support to *DeluxePaint III*, so you can do a similar effect with the *DeluxePaint* 64-color palette."

Heidi has eliminated the Lyon/Lamb pencil test, the Xerox checking, and the scenery artists with their sable brushes and endless tubes of colored paints. The only step that remains from the classical animation process that she learned so carefully at the feet of the Disney animation masters is the onionskin paper on which she begins her drawings. And Heidi may be able to eliminate even pencil and paper from her Amiga animation studio by drawing directly into the Amiga with Reichart von Wolfshield's new program, *Onion*.

Drawing animation directly into the Amiga requires two abilities: the ability to see through several frames at the same time and the ability to roll the drawings, so the animator can perceive the action in order to work on the next drawing. *Onion* will duplicate the function of the animation desk so that she can draw directly into the computer. She adds, "With *Onion*, you can see through your drawings like you can on a light board, and you can roll through the previous drawings and watch them move while you're working on the next one. You have immediate playback, right as you're drawing the frame, in real time or you can vary the playback. You can also store a *very* long series of drawings because Reichart has a very advanced method of compression. *Onion* would save me the step of digitizing, and I would never have to buy any more paper!"

> Three years ago, Heidi knew nothing about computers; now she supports herself completely using a hardworking Amiga 2000.

Sound Synchronization

When Mickey Mouse moves and speaks, we accept Mickey as a live character. But if one footstep sounded before his foot hit the ground or his mouth closed before we heard him stop speaking, his illusion of life would be shattered instantly. Making sure that a character's movements are synchronized perfectly with the soundtrack is crucial to the magic of animation.

After the director decides how he wants a scene timed in traditional animation, he hands the script to the voice-over artist and sound effects people who record the soundtrack. Then the soundreader painstakingly listens to the soundtrack at slow speed and writes down when every vowel, consonant, footstep and sound effect occurs on an "exposure sheet." The exposure sheet goes to the animator, who must match the character's movement exactly to where each pre-recorded sound will occur.

Heidi can't afford to hire a sound reader, but luckily her Amiga does the job quite handily. First, she digitizes the sound into the Amiga using [SunRize Industries'] *Perfect Sound*. Then she loads the IFF sound sample into *Cel Animator* where she can play it back and also create her own exposure sheet. Heidi explains the process:

"When I listened to the sound readers at Disney, I didn't think I could ever learn to animate to sound. Because when they crank a 35mm soundtrack slowly over a tape head, it sounds very muddy and garbled. I didn't even know what I was listening to. But once I load a digitized sound into the Amiga, *Cel Animator* breaks that sound into discrete chunks and plays them back at regular speed. So even though the sound is chopped up, it's very clear.

"Suppose I'm listening to 'hello' which plays over five frames; as I step through the frames, I'll hear 'heh . . eh . . eh . . lo . . o.' There's an on-screen gadget that will accept three characters, so I can type in the phoneme of the sound and see that on screen. Then I can save the sequence with its phoneme titles as an exposure file, which I can also print out as an exposure sheet. I gave a standard Disney exposure sheet to Jim Donaldson, the programmer, and he patterned the printout after the Disney sheet, but with a couple of new features added. This Amiga exposure sheet is more convenient and detailed than an industry standard exposure sheet. It's really excellent to work with."

So Heidi has found that the Amiga will completely replace the traditional sound reader, and that's important. She says "In professional work, you *never* animate first and then try to match the sound to it later. *Never* . . . that's very amateurish."

Cel Animator as an Educational Tool

While Heidi Turnipseed furnished professional tips á la Disney in the design of *Cel Animator*, anyone can use it, even *Cel Animator* programmer Jim Donaldson, who doesn't draw. Undaunted by graphic illiteracy, Donaldson created his own animation, "Where's Max?" and included it on the program disk, starring himself thinly disguised as computer graphics hero, Max Headroom.

Donaldson used A-Squared's Amiga Live! video digitizer and videotaped himself holding a microphone, saying,

"Where's Max?" Donaldson simply altered his playback order by doubling and staggering the frames to create the famous stutter effect "Wh-wh-wh-where's M-m-m-max?" in a 180-frame animation. So Donaldson not only proved that if Jim can, anyone can, but he pointed the way for audiophiles and other assorted musicians to create discrete files in *DeluxePaint III* and *Photon Paint,* then call them up in sync to music for a finished video with sound track.

But if you've yearned to learn to draw, the manual will lead you down the garden path toward professional animation. Says Heidi, "You can start off doing very simple things within the program and move up to using it on a professional level. It's chock full of hints and tips, and that's the idea—to make it something children could start with. I took pains to write the manual so that it was easy enough because when I was ten to 12 years old, I was already making little flip books on three by five cards. So I know what a difference an Amiga and *Cel Animator* would make to a young artist."

Final Output

When each movement looks realistic and every color looks superb, it's finally time to commit the animation to videotape for posterity. Although it is possible to record one frame at a time onto a pro video deck using MicroIllusions' transport controller, Heidi has found that the Amiga can do a satisfactory recording in real time onto her 8mm camcorder. Her Amiga 2000 is fully memory expanded to nine megabytes, so she's able to play back up to 96 frames of 320 × 400 resolution in full 4096-color HAM at a respectable ten frames a second, which amounts to 9.6 seconds of gorgeous animation.

"Most discrete scenes are no longer than ten seconds," she says, "so with nine megabytes I can animate just about anything I'd ever need to. I load the anim off disk, plug the output of my [Digital Creations] SuperGen genlock into my Olympus 8mm camcorder (the Movie 8 model) and lay the animation straight to tape. I like the 8mm format because it has a comb filter. It's visually crisper than VHS, and the colors come out much brighter. I've actually had better results with a second-generation VHS copy of an 8mm tape than I have taking it directly to VHS.

"I first saw some 8mm output when Jim Sachs was showing some scenes from his game *20,000 Leagues Under the Sea.* He had it plugged into an Amiga monitor; at first I thought it was playing off the CPU, and I couldn't understand how he was getting all that sound and animation out of memory." She laughs, "Then Jim showed me the 8mm, and I ran out and got one. I really love it. The color and resolution are 90 percent of what you see on the RGB Amiga monitor."

A Fateful Career and the Luck of the Amiga

Heidi Turnipseed was practically born to animation; as a child, frequent visits to the Never-Never World of Disneyland thrilled her spirit while Warner Brothers cartoons and Disney classics like *Pinnochio, Bambi, Peter Pan* and, of course, *Fantasia* filled her mind with magical colored images. The grade-school Heidi started making little animation flip books on three by five cards. As a more mature and polished artist at Beverly Hills High School, she drew raucous caricatures of her teachers, photocopied them for a nickel, and sold them to the other students for a quarter.

Disney had been a closed door to fledgling young animators, but by 1971, the Nine Old Men of Disney, who dominated animation for a quarter century, were getting old. Disney began a training program for its next generation of animation masters. In 1972, fresh from Cal Arts Institute (then Chouinard) and with portfolio in hand, Heidi entered the magical kingdom of Disney as an animator's apprentice. She says, "I worked around animators like Frank Thompson and Ollie Johnson, who wrote the big book on animation called *The Illusion of Light.* Most of the animators were in their 60's and didn't retire until their 70's. So that was the idea, that these experienced people who had worked on all the Disney classics could influence and train a new crop of animators."

She was in awe of these names she had only known as screen credits from her youth, but all was not bliss in the timeclock world of a production studio. "There was a lot of pressure," she says. "When there's a deadline crunch, you're expected to be at the studio six or seven days a week from ten to 15 hours a day. And everyone knows if you're there or not."

And there were other thorns on the rose; Heidi does not smoke, rarely drinks and does not use mind-altering substances (other than the Amiga), so it was a huge irritation that her studio roommate smoked. While wisps of lingering carbon monoxide filled the room, Heidi's fertile imagination strained to create its enchanted reality in the foreign soil of yet other studio obstacles. Says she, "You've always got the supervisor walking by and looking over your shoulder. People come in and out of your room, and they talk and interrupt you. Our animation desks were six feet high because they had shelves in front of you. So I turned mine around facing the door and put plants all the way across the top of it. The only way to get back to my space was to walk around the animation desk, and there was only 14 inches of space where you could squeeze by. That was all I could do to say 'Hey, leave me alone and let me concentrate on my work.'"

But fate had already laid its plans for Heidi to leave Disney. Of the many star animators at Disney, she could not have chosen a brighter one than Don Bluth, whose meteoric career was bound to her own. The fledgling Heidi started out at Disney as an inbetweener for Don Bluth, and as she moved up the ranks she stayed with him as his breakdown artist and assistant animator.

Finally she made full animator in 1978 on "The Small One," a little Christmas story about the donkey that carried Mary to Bethlehem—directed, of course, by Don Bluth.

Heidi describes the charismatic Bluth, who became her close friend, as a paradox: "He was a loner, more than any person I ever knew. Yet he can develop professional friendships and inspire people to do their best work." In a move which shook the animation world in 1979, Bluth left Disney to form his own production company; Heidi and 14 other animators went with him. She remembers, "It caused an uproar. There were articles all over the papers about all these people who left Disney at once, who were most of the crop of young animators they had trained since the early '70's."

At first the renegade Bluth and his merry band of animators labored in the humble garage of his Culver City home on the cult classic, *Banjo the Woodpile Cat.* With the profits from *Banjo,* Bluth rented a studio to produce his animation masterpiece *The Secret of NIMH. NIMH* was an endearing story about a race of rats made super intelligent by injection of psychotropic drugs in the laboratories of the National Institute of Mental Health, who are saved by a little mother mouse who alone must face the forces of evil. *NIMH* was 86 minutes of mystical animation which tugged at the heartstrings of millions. Don Bluth Productions had arrived, and the production talents of Stephen Spielberg came knocking on the

Bluth studio door. Heidi was busy animating *An American Tail,* the story of an immigrant Russian mouse who sails to America because "there are no cats in America and the streets are paved with cheese" when Bluth received an enchanting offer from The Emerald Isle, where low costs beckoned him. Heidi agonized over the decision to stay behind, "If I had moved to Ireland, my husband wouldn't have been able to work, while an animator normally works 80 hours a week. He would have had to sit home all day in a picturesque thatched hut, twiddling his thumbs."

After Bluth left for Ireland, Heidi had to map a new course for her career: "I had broken away from wanting to be in the studio. I didn't want to go back and work in house at Disney or Filmation or one of the Saturday morning cartoon crank-out studios."

By chance a magazine ad led Heidi to the Amiga. But how was an unemployed animator going to buy a computer? If it weren't for Heidi's loving dad, we probably would never have seen her gorgeous classical animation on an Amiga screen. "My father gave me the computer with a card that said, 'Happy Birthday, Merry Christmas . . . Happy Birthday, Merry Christmas . . . Happy Birthday, Merry Christmas.'"

Heidi was still struggling with one disk drive and no expansion RAM when she met Jim Miller at an Amiga user's group meeting. They digitized the drawings of an animation from "Dragon's Lair 2," which was never released, right into the Amiga and played them back on the monitor. She remembers, "I had never seen a page-flipper program before, and I was completely tickled. I realized that I could use the Amiga to pencil test at home and it just gave me goosebumps."

MicroIllusions asked Heidi to show her animation at their SIGGRAPH booth in 1987, and soon Daphne's mother, the overripe damsel of the Valkyries with buxom bosoms bulging, was a raucous hit. Thousands of SIGGRAPH visitors thrilled to the first classical Disney animation on the Amiga as the Norsewoman's generous animated mouth opened in an everwidening shriek that left her epiglottis a-tremble.

But this was only the beginning as MicroIllusions' Jim Steinert began to fulfill his dream of creating a professional series of graphic, animation and video tools. Heidi wrote page after literate page in the impressive series of manuals for *Photon Paint 1.0* and *2.0* as well as *Cel Animator.*

Heidi is currently laboring on a MicroIllusions game, *The Jetsons,* based on the animated cult TV classic. To save on disk space, she's designing the over 80 screens in *DeluxePaint III* using the Amiga's 320 × 200 low-res mode.

Speaking of *DeluxePaint III,* Heidi's animation of programmer Dan Silva juggling Electronic Art's trademark sphere, cube and cone, while riding a unicycle, is plastered all over *DPaint III*'s packaging and is reproduced as a flip book animation on the very pages of the manual. And it's included as an Anim brush on the art disk, so you can have your very own genius programmer juggling and pedaling like mad on your computer screen. Although Dan Silva admitted to us that he can only juggle two—not three—objects at a time and has never mastered the unicycle, Heidi made him look like a pro at both.

> "When I realized that I could use the Amiga to pencil test at home it just gave me goosebumps."

"The ability to create an Anim brush in *DPaint III* is fabulous," says Heidi. "It only took five frames to make Dan's legs pedal one revolution on the unicycle, but I needed 15 frames to juggle all three of the EA shapes. So I picked up the legs and the unicycle as an Anim brush and told the program to repeat it for 15 frames. Then all I had to animate for the full 15 frames were his arms and the juggled shapes."

Talent is its own best advertisement, and Heidi was demonstrating her lovely work at an L.A. Amiga Users Group (LAAUG) meeting one night. As chance would have it, John Kafka of Murakami Wolf Swenson was there. Mickey's birthday celebration was running behind schedule, so he hired her as an animation subcontractor right on the spot. After a nine-year absence, she was working for Disney again but this time from the comfort of her own home.

Disney Television Studios sent Heidi a videotape of the live actors and soundtrack, an exposure sheet of the scenes and the tracing paper showing the rough outlines of where the live actors would be, known in the trade as a "rotoscope." Although this exposure sheet and rough rotoscope helped speed things up for Heidi, what the Disney crew didn't know was that she could have done them all herself just using the videotape, the Amiga, *Cel Animator* and her SuperGen genlock.

After the initial shock of seeing Heidi's first pencil test with synced sound, segment director Sam Cornell enjoyed seeing each of her pencil tests. But as the insane deadline crunch of the last week of production set in, he began to doubt there was time for even these essentials and he asked her to just turn in her drawings ASAP, since the rest of her work looked good. The perfectionist in Heidi rebelled; she had to see if her work looked right. "I shot a test before I left home just for myself," she recalls. "That way if something wasn't as good as I wanted it to be, I could change it before I turned it in."

The Amiga was making Heidi's life easier, as well as more profitable. In one month, Heidi produced over 50 feet of animation, for a Disney paycheck of over $5000; she contrasts that with typical studio footage, "You were a star performer if you did ten feet a week at Disney or Bluth. I remember Ollie Johnson (one of the Nine Old Men) was at the top of the footage list on *The Rescuers,* and he had a weekly average of eight to nine feet. And I did 12 feet on my own! Not only did I get more work done than I did when I was under the pressure of the studio, but I was happier and did better work." The only hindrance to Heidi's home productivity is Punkin the cat whom she regretfully banished from the studio for loud purring, the laying on of papers and other furry offerings.

Back to the Future

At SIGGRAPH 1987, famous Disney animator Frank Thomas declared with authority that if anyone was going to make use of computer technology to facilitate animation, it was the Disney artist. "An artist with a pure technological background just doesn't know how to give characters personality," he said.

Disney alumnus John Lasseter proved him right this year when he won the Academy Award for his computer animation, *Tin Toy.* And Disney has bought many, many Amigas with vague hints about some secret project.

Heidi wished on an Amiga star, and most of her dreams have now come true. Remote as a mountain from the maddening crowds, Heidi Turnipseed is free to ride her horse or go for walks in the pure country air. Yet she is microseconds away from the hustle of commerce through a fax machine, modem and an Amiga 2000. Truly, Heidi and her Amiga seem destined to live happily ever after. ■

The programs which appear in this magazine have been run, tested and checked for bugs and errors. After a program is tested, it is printed on a letter quality printer with some formatting changes. This listing is then photographed directly and printed in the magazine. Using this method ensures the most error-free program listings possible.

Whenever you see a word inside brackets, such as [DOWN], the word represents a keystroke or series of keystrokes on the keyboard. The word [DOWN] would be entered by pressing the cursor-down key. If multiple keystrokes are required, the number will directly follow the word. For example, [DOWN4] would mean to press the cursor-down key four times. If there are multiple words within one set of brackets, enter the keystrokes directly after one another. For example, [DOWN, RIGHT2] would mean to press the cursor-down key once and then the cursor-right key twice. Note: Do not enter the commas.

In addition to these graphic symbols, the keyboard graphics are all represented by a word and a letter. The word is either SHFT or CMD and represents the SHIFT key or the Commodore key. The letter is one of the letters on the keyboard. The combination [SHFT E] would be entered by holding down the SHIFT key and pressing the E. A number following the letter tells you how many times to type the letter. For example, [SHFT A4,CMD B3] would mean to hold the SHIFT key and press the A four times, then hold down the Commodore key and press the B three times.

The following chart tells you the keys to press for any word or words inside of brackets. Refer to this chart whenever you aren't sure what keys to press. The little graphic next to the keystrokes shows you what you will see on the screen.

SYNTAX ERROR

This is by far the most common error encountered while entering a program. Usually (sorry folks) this means that you have typed something incorrectly on the line the syntax error refers to. If you get the message "?Syntax Error Break In Line 270", type LIST 270 and press RETURN. This will list line 270 to the screen. Look for any non-obvious mistakes like a zero in place of an O or vice-versa. Check for semicolons and colons reversed and extra or missing parenthesis. All of these things will cause a syntax error.

There is only one time a syntax error will tell you the "wrong" line to look at. If the line the syntax error refers to has a function call (i.e., FN A(3)), the syntax error may be in the line that defines the function, rather than the line named in the error message. Look for a line near the beginning of the program (usually) that has DEF FN A(X) in it with an equation following it. Look for a typo in the equation part of this definition.

ILLEGAL QUANTITY ERROR

This is another common error message. This can also be caused by a typing error, but it is a little harder to find. Once again, list the line number that the error message refers to. There is probably a poke statement on this line. If there is, then the error is referring to what is trying to be poked. A number must be in the range of zero to 255 to be poke-able. For example, the statement POKE 1024,260 would produce an illegal quantity error because 260 is greater than 255.

Most often, the value being poked is a variable (A,X...). This error is telling you that this variable is out of range. If the variable is being read from data statements, then the problem is somewhere in the data statements. Check the data statements for missing commas or other typos.

If the variable is not coming from data statements, then the problem will be a little harder to find. Check each line that contains the variable for typing mistakes.

OUT OF DATA ERROR

This error message is always related to the data statements in a program. If this error occurs, it means that the program has run out of data items before it was supposed to. It is usually caused by a problem or typo in the data statements. Check first to see if you have left out a whole line of data. Next, check for missing commas between numbers. Reading data from a page of a magazine can be a strain on the brain, so use a ruler or a piece of paper or anything else to help you keep track of where you are as you enter the data.

OTHER PROBLEMS

It is important to remember that the 64 and the PET/CBM computers will only accept a line up to 80 characters long. The VIC 20 will accept a line up to 88 characters long. Sometimes you will find a line in a program that runs over this number of characters. This is not a mistake in the listing. Sometimes programmers get so carried away crunching programs that they use abbreviated commands to get more than 80 (or 88) characters on one line. You can enter these lines by abbreviating the commands when you enter the line. The abbreviations for BASIC commands are on pages 133-134 of the VIC 20 user guide and 130-131 of the Commodore 64 user's guide.

If you type a line that is longer than 80 (or 88) characters, the computer will act as if everything is ok, until you press RETURN. Then, a syntax error will be displayed (without a line number). Many people write that the computer gives them a syntax error when they type the line, or that the computer refuses to accept a line. Both of these problems are results of typing a line of more than 80 (or 88) characters.

"[HOME]" = UNSHIFTED CLR/ HOME	"[PURPLE]" = CONTROL 5	"[F1]" = F1
"[CLEAR]" = SHIFTED CLR/HOME	"[GREEN]" = CONTROL 6	"[F2]" = F2
"[DOWN]" = CURSOR DOWN	"[BLUE]" = CONTROL 7	"[F3]" = F3
"[UP]" = CURSOR UP	"[YELLOW]" = CONTROL 8	"[F4]" = F4
"[RIGHT]" = CURSOR RIGHT	"[ORANGE]" = COMMODORE 1	"[F5]" = F5
"[LEFT]" = CURSOR LEFT	"[BROWN]" = COMMODORE 2	"[F6]" = F6
"[RVS]" = CONTROL 9	"[L. RED]" = COMMODORE 3	"[F7]" = F7
"[RVOFF]" = CONTROL 0	"[GRAY1]" = COMMODORE 4	"[F8]" = F8
"[BLACK]" = CONTROL 1	"[GRAY2]" = COMMODORE 5	"[POUND]" = ENGLISH POUND
"[WHITE]" = CONTROL 2	"[L. GREEN]" = COMMODORE 6	"[SHFT ^]" = PI SYMBOL
"[RED]" = CONTROL 3	"[L. BLUE]" = COMMODORE 7	"[^]" = UP ARROW
"[CYAN]" = CONTROL 4	"[GRAY3]" = COMMODORE 8	

GRAPHIC SYMBOLS WILL BE REPRESENTED AS EITHER THE LETTERS SHFT (SHIFT) AND A KEY ("[SHFT Q,SHFT J,SHFT D,SHFT S]") OR THE LETTERS CMDR (COMMODORE) AND A KEY ("[CMDR Q,CMDR G,COMDR Y,CMDR H]"). IF A SYMBOL IS REPEATED, THE NUMBER OF REPITITIONS WILL BE DIRECTLY AFTER THE KEY AND BEFORE THE COMMA ("[SPACE3,SHFT S4,CMDR M2]").

THE PROGRAM WON'T RUN!!

This is the hardest of problems to resolve; no error message is displayed, but the program just doesn't run. This can be caused by many small mistakes typing a program in. First check that the program was written for the computer you are using. Check to see if you have left out any lines of the program. Check each line of the program for typos or missing parts. Finally, press the RUN/STOP key while the program is "running". Write down the line the program broke at and try to follow the program backwards from this point, looking for problems.

IF ALL ELSE FAILS

You've come to the end of your rope. You can't get the program to run and you can't find any errors in your typing. What do you do? As always, we suggest that you try a local user group for help. In a group of even just a dozen members, someone is bound to have typed in the same program. The user group may also have the program on a library disk and be willing to make a copy for you.

If you do get a working copy, be sure to compare it to your own version so that you can learn from your errors and increase you understanding of programming.

If you live in the country, don't have a local user group, or you simply can't get any help, write to us. If you do write to us, include the following information about the program you are having problems with:

The name of the program
The issue of the magazine it was in
The computer you are using
Any error messages and the line numbers
Anything displayed on the screen
A printout of your listing (if possible)

All of this information is helpful in answering your questions about why a program doesn't work. A letter that simply states "I get an error in line 250 whenever I run the program" doesn't give us much to go on. Send your questions to:

Commodore Magazine
1200 Wilson Drive
West Chester, PA 19380
ATTN: Program Problem

Have fun with the programs!

HOW TO USE THE MAGAZINE ENTRY PROGRAMS

The Magazine Entry Programs on the next pages are two BASIC machine language programs that will assist you in entering the programs in this magazine correctly. There are versions for both the Commodore 64 and the Commodore 128. Once the program is in place, it works its magic without you having to do anything else. The program will not let you enter a line if there is a typing mistake on it, and better yet, it identifies the kind of error for you.

Getting Started

Type in the Magazine Entry Program carefully and save it as you go along (just in case). Once the whole program is typed in, save it again on tape or disk. Now RUN the program. The word POKING will appear on the top of the screen with a number. The number will increment from 49152 up to 49900 (4864-5545 on the 128) and just lets you know that the program is running. If everything is ok, the program will finish running and say DONE. Then type NEW. If there is a problem with the data statements, the program will tell you where to find the problem. Otherwise the program will say "mistake in data statements." Check to see if commas are missing, or if you have used periods instead of commas. Also check the individual data items.

Once the program has run, it is in memory ready to go. To activate the program type SYS49152 (SYS4864 on the 128), and press RETURN. You are now ready to enter the programs from the magazine. To disable the Entry Program, just type KILL [RETURN] on the 64 or SYS4867 on the 128.

The checksums for each line are the same for both the 64 and 128, so you can enter your 64 programs on the 128 if you'd like.

Typing the Programs

All the BASIC program listings in this magazine that are for the 64 or 128 have an apostrophe followed by four letters at the end of the line (e.g., 'ACDF). If you plan to use the Magazine Entry Program to enter your programs, the apostrophe and letters **should** be entered along with the rest of the line. This is a checksum that the Magazine Entry Program uses.

Enter the line and the letters at the end and then press RETURN, just as you normally would.

If the line is entered correctly, a bell is sounded and the line is entered into the computer's memory (without the characters at the end).

If a mistake was made while entering the line, a noise is sounded and an error message is displayed. Read the error message, then press any key to erase the message and correct the line.

IMPORTANT

If the Magazine Entry Program sees a mistake on a line, it **does not** enter that line into memory. This makes it impossible to enter a line incorrectly.

Error Messages and What They Mean

There are five error messages that the Magazine Entry Program uses. Here they are, along with what they mean and how to fix them.

NO CHECKSUM: This means that you forgot to enter the apostrophe and the four letters at the end of the line. Move the cursor to the end of the line you just typed and enter the checksum.

QUOTE: This means that you forgot (or added) a quote mark somewhere in the line. Check the line in the magazine and correct the quote.

KEYWORD: This means that you have either forgotten a command or spelled one of the BASIC keywords (GOTO, PRINT..) incorrectly. Check the line in the magazine again and check your spelling.

OF CHARACTERS: This means that you have either entered extra characters or missed some characters. Check the line in the magazine again. This error message will also occur if you misspell a BASIC command, but create another keyword in doing so. For example, if you misspell PRINT as PRONT, the 64 sees the letter P and R, the BASIC keyword ON and then the letter T. Because it sees the keyword ON, it thinks you've got too many characters, instead of a simple misspelling. Check spelling of BASIC commands if you can't find anything else wrong.

UNIDENTIFIED: This means that you have either made a simple spelling error, you typed the wrong line number, or you typed the checksum incorrectly. Spelling errors could be the wrong number of spaces inside quotes, a variable spelled wrong, or a word misspelled. Check the line in the magazine again and correct the mistake.

The Magazine Entry Programs are available on disk, along with other programs in this magazine, for $9.95. To order, contact Loadstar at 1-800-831-2694.

```
10 PRINT"[CLEAR]POKING -";
20 P=49152 :REM $C000  (END AT
   49900/$C2EC)
30 READ A$:IF A$="END"THEN 110
40 L=ASC(MID$(A$,2,1))
50 H=ASC(MID$(A$,1,1))
60 L=L-48:IF L>9 THEN L=L-7
70 H=H-48:IF H>9 THEN H=H-7
80 PRINT"[HOME,RIGHT12]"P;
90 IF H>15 OR L>15 THEN PRINT
   :PRINT"DATA ERROR IN LINE";
   1000+INT((P-49152)/8):STOP
100 B=H*16+L:POKE P,B:T=T+B:P=P+1
    :GOTO 30
110 IF T<>86200 THEN PRINT
    :PRINT"MISTAKE IN DATA --> CHECK
    DATA STATEMENTS":END
120 PRINT"DONE":END
1000 DATA 4C,1F,C0,00,00,00,00,00
1001 DATA 00,00,00,00,00,0D,00,21
1002 DATA C1,27,C1,2F,C1,3F,C1,4C
1003 DATA C1,EA,EA,EA,4C,54,C0,A2
1004 DATA 05,BD,19,C0,95,73,CA,10
1005 DATA F8,60,60,A0,03,B9,00,02
1006 DATA D9,04,C1,D0,F5,88,10,F5
1007 DATA A0,05,B9,A2,E3,99,73,00
1008 DATA 88,10,F7,A9,00,8D,18,D4
1009 DATA 4C,EF,C0,E6,7A,D0,02,E6
1010 DATA 7B,4C,79,00,A5,9D,F0,F3
1011 DATA A5,7A,C9,FF,D0,ED,A5,7B
1012 DATA C9,01,D0,E7,20,2B,C0,AD
1013 DATA 00,02,20,74,C0,90,DC,A0
1014 DATA 00,4C,A9,C1,C9,30,30,06
1015 DATA C9,3A,10,02,38,60,18,60
1016 DATA C8,B1,7A,C9,20,D0,03,C8
1017 DATA D0,F7,B1,7A,60,18,C8,B1
1018 DATA 7A,F0,37,C9,22,F0,F5,6D
1019 DATA 03,C0,8D,03,C0,AD,04,C0
1020 DATA 69,00,8D,04,C0,4C,8E,C0
1021 DATA 18,6D,05,C0,8D,05,C0,90
1022 DATA 03,EE,06,C0,EE,09,C0,4C
1023 DATA CE,C1,18,6D,08,C0,8D,08
1024 DATA C0,90,03,EE,07,C0,EE,0A
1025 DATA C0,60,0A,A8,B9,0F,C0,85
1026 DATA FB,B9,10,C0,85,FC,A0,00
1027 DATA A9,12,20,D2,FF,B1,FB,F0
1028 DATA 06,20,D2,FF,C8,D0,F6,20
1029 DATA BC,C2,20,E4,FF,F0,FB,A0
1030 DATA 18,B9,08,C1,20,D2,FF,88
1031 DATA 10,F7,68,68,A9,00,8D,00
1032 DATA 02,4C,74,A4,4B,49,4C,4C
1033 DATA 91,91,0D,20,20,20,20,20
1034 DATA 20,20,20,20,20,20,20,20
1035 DATA 20,20,20,20,20,20,20,91
1036 DATA 0D,51,55,4F,54,45,00,4B
1037 DATA 45,59,57,4F,52,44,00,23
1038 DATA 20,4F,46,20,43,48,41,52
1039 DATA 41,43,54,45,52,53,00,55
1040 DATA 4E,49,44,45,4E,54,49,46
1041 DATA 49,45,44,00,4E,4F,20,43
1042 DATA 48,45,43,4B,53,55,4D,00
1043 DATA C8,B1,7A,D0,FB,84,FD,C0
1044 DATA 09,10,03,4C,84,C1,88,88
1045 DATA 88,88,88,B1,7A,C9,27,D0
1046 DATA 13,A9,00,91,7A,C8,A2,00
1047 DATA B1,7A,9D,3C,03,C8,E8,E0
1048 DATA 04,D0,F5,60,A9,04,4C,CA
1049 DATA C0,A0,00,B9,00,02,99,40
1050 DATA 03,F0,F0,C8,D0,F5,A0,00
1051 DATA B9,40,03,F0,E6,99,00,02
1052 DATA C8,D0,F5,20,96,C1,4C,12
1053 DATA C2,A0,09,A9,00,99,03,C0
1054 DATA 8D,3C,03,88,10,F7,A9,80
1055 DATA 85,02,A0,00,20,58,C1,20
1056 DATA 89,C1,20,ED,C1,E6,7A,E6
1057 DATA 7B,20,7C,A5,A0,00,20,80
1058 DATA C0,F0,D0,24,02,F0,06,4C
1059 DATA A8,C0,4C,CE,C1,C9,22,D0
1060 DATA 06,20,8D,C0,4C,CE,C1,20
1061 DATA BA,C0,4C,CE,C1,A0,00,B9
1062 DATA 00,02,20,74,C0,C8,90,0A
1063 DATA 18,6D,07,C0,8D,07,C0,4C
1064 DATA EF,C1,88,A2,00,B9,00,02
1065 DATA 9D,00,02,F0,04,E8,C8,D0
1066 DATA F4,60,18,AD,09,C0,69,41
1067 DATA 8D,09,C0,38,AD,0A,C0,E9
1068 DATA 19,90,06,8D,0A,C0,4C,1C
1069 DATA C2,AD,0A,C0,69,41,8D,0A
1070 DATA C0,AD,03,C0,6D,05,C0,48
1071 DATA AD,04,C0,6D,06,C0,8D,0C
1072 DATA C0,68,6D,08,C0,8D,0B,C0
1073 DATA AD,0C,C0,6D,07,C0,8D,0C
1074 DATA C0,38,E9,19,90,06,8D,0C
1075 DATA C0,4C,52,C2,AD,0C,C0,69
1076 DATA 41,8D,0C,C0,AD,0B,C0,E9
1077 DATA 19,90,06,8D,0B,C0,4C,67
1078 DATA C2,AD,0B,C0,69,41,8D,0B
1079 DATA C0,A0,01,AD,09,C0,CD,3C
1080 DATA 03,D0,20,C8,AD,0A,C0,CD
1081 DATA 3D,03,D0,17,C8,AD,0B,C0
1082 DATA CD,3E,03,D0,0E,AD,0C,C0
1083 DATA CD,3F,03,D0,06,20,CC,C2
1084 DATA 4C,4B,C0,98,48,68,4C,CA
1085 DATA C0,A9,20,8D,00,D4,8D,01
1086 DATA D4,A9,09,8D,05,D4,A9,0F
1087 DATA 8D,18,D4,60,20,A9,C2,A9
1088 DATA 81,20,DF,C2,A9,80,20,DF
1089 DATA C2,4C,D9,C2,20,A9,C2,A9
1090 DATA 11,20,DF,C2,A9,10,20,DF
1091 DATA C2,A9,00,8D,04,D4,60,8D
1092 DATA 04,D4,A2,70,A0,00,88,D0
1093 DATA FD,CA,D0,FA,60,END
```

END

```
5 TRAP 200
10 PRINT"[CLEAR]POKING -";
20 P=4864 :REM $1300  (END AT
   5545/$15A9)
30 READ A$:IF A$="END"THEN 110
80 PRINT"[HOME,RIGHT12]"P;
100 B=DEC(A$):POKE P,B:T=T+B:P=P+1
   :GOTO 30
110 IF T<>59382 THEN PRINT
   :PRINT"MISTAKE IN DATA --> CHECK
   DATA STATEMENTS":END
120 PRINT"DONE":END
200 PRINT:PRINT"DATA ERROR IN LINE";
   1000+INT((P-4864)/8):END
1000 DATA 4C,1E,13,4C,3A,13,00,00
1001 DATA 8E,00,F7,00,42,41,51,57
1002 DATA 0D,00,0D,43,08,14,0E,14
1003 DATA 16,14,26,14,33,14,A9,00
1004 DATA 8D,00,FF,AD,04,03,8D,12
1005 DATA 13,AD,05,03,8D,13,13,A2
1006 DATA 4A,A0,13,8E,04,03,8C,05
1007 DATA 03,60,AD,12,13,8D,04,03
1008 DATA AD,13,13,8D,05,03,60,6C
1009 DATA 12,13,A5,7F,D0,F9,AD,00
1010 DATA 02,20,5B,13,90,F1,A0,00
1011 DATA 4C,6F,14,C9,30,30,06,C9
1012 DATA 3A,10,02,38,60,18,60,C8
1013 DATA B1,3D,C9,20,D0,03,C8,D0
1014 DATA F7,B1,3D,60,18,C8,B1,3D
1015 DATA F0,35,C9,22,F0,F5,6D,06
1016 DATA 13,8D,06,13,AD,07,13,69
1017 DATA 00,8D,07,13,4C,75,13,18
1018 DATA 6D,08,13,8D,08,13,90,03
1019 DATA EE,09,13,EE,0C,13,60,18
1020 DATA 6D,0B,13,8D,0B,13,90,03
1021 DATA EE,0A,13,EE,0D,13,60,0A
1022 DATA A8,B9,14,13,85,FB,B9,15
1023 DATA 13,85,FC,A0,00,8C,00,FF
1024 DATA A9,12,20,D2,FF,B1,FB,F0
1025 DATA 06,20,D2,FF,C8,D0,F6,20
1026 DATA 79,15,20,A3,15,20,E4,FF
1027 DATA F0,FB,A0,1B,B9,EF,13,20
1028 DATA D2,FF,88,10,F7,68,68,A9
1029 DATA 00,8D,00,02,4C,B7,4D,91
1030 DATA 91,0D,20,20,20,20,20,20
1031 DATA 20,20,20,20,20,20,20,20
1032 DATA 20,20,20,20,20,20,91,0D
1033 DATA 51,55,4F,54,45,00,4B,45
1034 DATA 59,57,4F,52,44,00,23,20
1035 DATA 4F,46,20,43,48,41,52,41
1036 DATA 43,54,45,52,53,00,55,4E
1037 DATA 49,44,45,4E,54,49,46,49
1038 DATA 45,44,00,4E,4F,20,43,48
1039 DATA 45,43,4B,53,55,4D,00,C8
1040 DATA B1,3D,D0,FB,98,30,04,C9
1041 DATA 06,30,1E,88,88,88,88,88
1042 DATA B1,3D,C9,27,D0,13,A9,00
1043 DATA 91,3D,C8,A2,00,B1,3D,9D
1044 DATA 00,0B,C8,E8,E0,04,D0,F5
1045 DATA 60,4C,5C,15,4C,C5,14,A0
1046 DATA 09,A9,00,99,06,13,8D,00
1047 DATA 0B,88,10,F7,A9,80,85,FD
1048 DATA A0,00,20,3F,14,20,AE,14
1049 DATA 20,0D,43,84,FA,A0,FF,20
1050 DATA 67,13,F0,D8,24,FD,F0,06
1051 DATA 20,8F,13,4C,8F,14,C9,22
1052 DATA D0,06,20,74,13,4C,8F,14
1053 DATA 20,9F,13,4C,8F,14,A0,00
1054 DATA B9,00,02,20,5B,13,C8,90
1055 DATA 0A,18,6D,0A,13,8D,0A,13
1056 DATA 4C,B0,14,88,60,18,AD,0C
1057 DATA 13,69,41,8D,0C,13,38,AD
1058 DATA 0D,13,E9,19,90,06,8D,0D
1059 DATA 13,4C,CF,14,AD,0D,13,69
1060 DATA 41,8D,0D,13,AD,06,13,6D
1061 DATA 08,13,48,AD,07,13,6D,09
1062 DATA 13,8D,0F,13,68,6D,0B,13
1063 DATA 8D,0E,13,AD,0F,13,6D,0A
1064 DATA 13,8D,0F,13,38,E9,19,90
1065 DATA 06,8D,0F,13,4C,05,15,AD
1066 DATA 0F,13,69,41,8D,0F,13,AD
1067 DATA 0E,13,E9,19,90,06,8D,0E
1068 DATA 13,4C,1A,15,AD,0E,13,69
1069 DATA 41,8D,0E,13,A0,01,AD,0C
1070 DATA 13,CD,00,0B,D0,20,C8,AD
1071 DATA 0D,13,CD,01,0B,D0,17,C8
1072 DATA AD,0E,13,CD,02,0B,D0,0E
1073 DATA AD,0F,13,CD,03,0B,D0,06
1074 DATA 20,89,15,A4,FA,60,98,48
1075 DATA 68,4C,AF,13,A9,04,4C,AF
1076 DATA 13,A9,00,8D,00,FF,A9,20
1077 DATA 8D,00,D4,8D,01,D4,A9,09
1078 DATA 8D,05,D4,A9,0F,8D,18,D4
1079 DATA 60,20,61,15,A9,81,20,9C
1080 DATA 15,A9,80,20,9C,15,4C,96
1081 DATA 15,20,61,15,A9,11,20,9C
1082 DATA 15,A9,10,20,9C,15,A9,00
1083 DATA 8D,04,D4,60,8D,04,D4,A2
1084 DATA 70,A0,00,88,D0,FD,CA,D0
1085 DATA FA,60,END
```

END

Continued from page 76

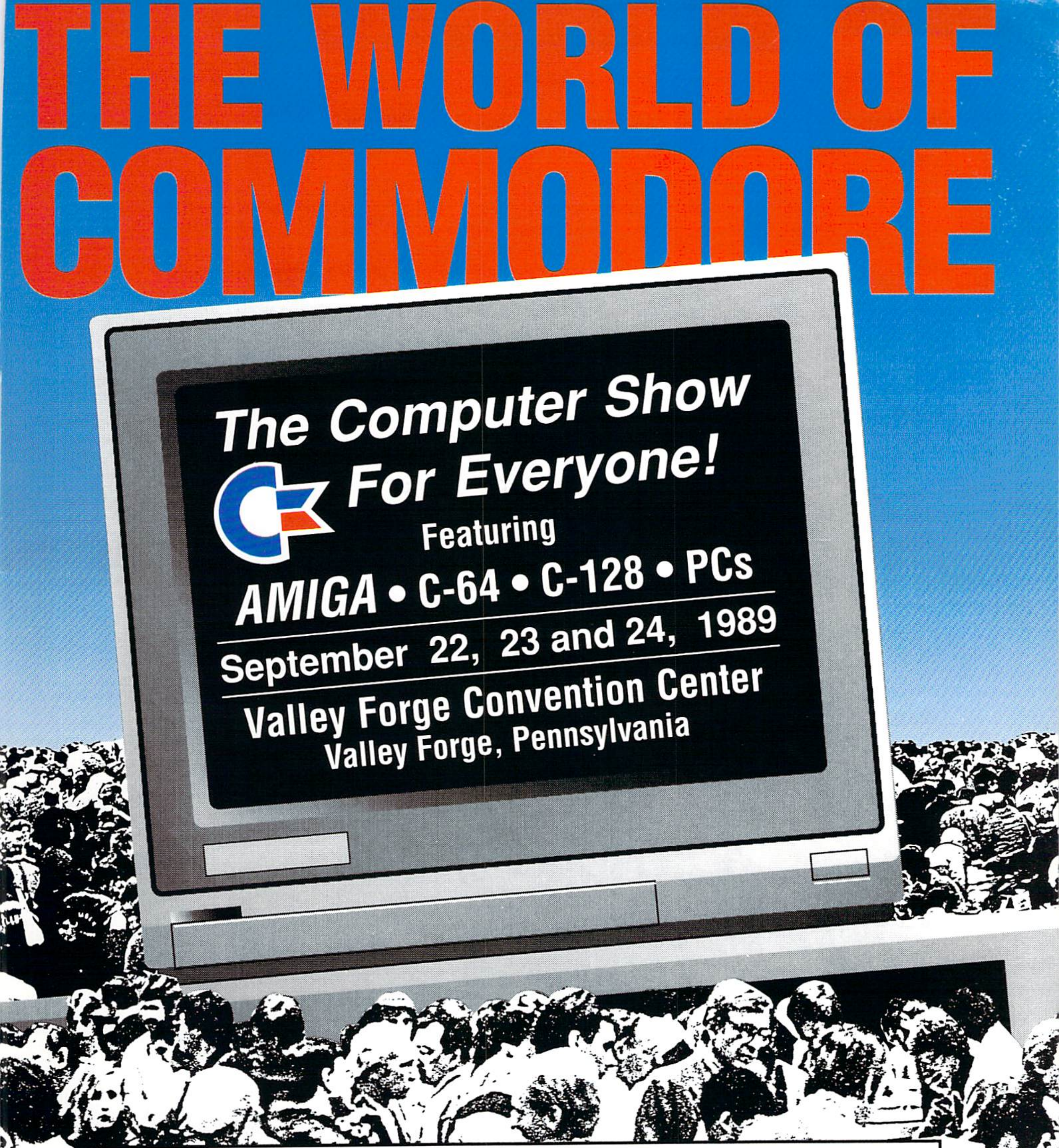
```
2130 DATA 0,83,113,41,0,0,38,21,21'BYJD
2140 END:GOTO 2150'CFLB
2150 SCRATCH"LOC.DATA":DSAVE"LOC.DATA"
     :RETURN'DCMH
```

END

ROADS.CRE

```
10 SCRATCH"[SHFT R]OADS"
   :DOPEN#2,"[SHFT R]OADS,S",W
   :FOR I=1 TO 51:READ R$:PRINT#2,R$
   :NEXT:DCLOSE:DCLEAR'KANN
1000 DATA "[SHFT I]-40","[SHFT I]-55",
     "[SHFT C]RUMP"'BCSX
1010 DATA "[SHFT U,SHFT S] 61","
     [SHFT I]-240","[SHFT A]
     IRWAYS"'BCTB
1020 DATA "[SHFT L]AMAR","[SHFT G]
     ETWELL","[SHFT M]OUNT [SHFT M]
     ORIAH"'BCEE
1030 DATA "[SHFT P]ERKINS","[SHFT W]
     ALNUT [SHFT G]ROVE","[SHFT I]
     -40 [SHFT O]VERTON [SHFT P]ARK
     [SHFT S]PUR"'BCXL
1040 DATA "[SHFT P]OPLAR","[SHFT G]
     RAHAM","[SHFT H]IGHLAND"'BCSF
1050 DATA "[SHFT E]AST [SHFT P]
     ARKWAY","[SHFT U,SHFT S] 51","
     [SHFT W]INCHESTER"'BCKJ
1060 DATA "[SHFT M]ENDENHALL","
     [SHFT H]ICKORY [SHFT H]ILL","
     [SHFT J]ACKSON"'BCHK
1070 DATA "[SHFT A]USTIN [SHFT P]EAY
     [SHFT H]IGHWAY","[SHFT I]-240
     [SHFT S]PUR","[SHFT U,SHFT S]
      51 [SHFT S]PUR"'BCTP
1080 DATA "[SHFT U]NION","[SHFT A]
     UCTION","[SHFT G]OODLETT"'BCIJ
1090 DATA "[SHFT S]UMMER","[SHFT S]
     YCAMORE [SHFT V]IEW","[SHFT B]
     RIERVIEW"'BCJN
1100 DATA "[SHFT H]UMPHREYS [SHFT B]
     LVD.","[SHFT S]HADY [SHFT G]
     ROVE","[SHFT K]IRBY [SHFT P]
     ARKWAY"'BCWJ
1110 DATA "[SHFT S]OUTH [SHFT S]HADY
     [SHFT G]ROVE","[SHFT R]IDGEWAY",
     "[SHFT N]ORTH [SHFT P]
     ARKWAY"'BCRJ
1120 DATA "[SHFT M]C[SHFT L]EAN
     [SHFT B]LVD.","[SHFT W]HITNEY","
     [SHFT F]RAYSER [SHFT B]LVD."'BCQI
1130 DATA "[SHFT W]ATKINS","[SHFT N]
     EW [SHFT A]LLEN","[SHFT R]
     ALEIGH"'BCGG
1140 DATA "[SHFT Y]ALE","[SHFT S]
     TRATFORD","[SHFT C]OVINGTON
     [SHFT P]IKE"'BCQI
1150 DATA "[SHFT S]INGLETON [SHFT P]
     ARKWAY","[SHFT B]ARRETT [SHFT P]
     ARKWAY","[SHFT S]OUTH [SHFT P]
     ARKWAY"'BCCQ
1160 DATA "[SHFT M]ITCHELL","[SHFT N]
     ATIONAL","[SHFT T]REZEVANT"'BCWJ
```

END


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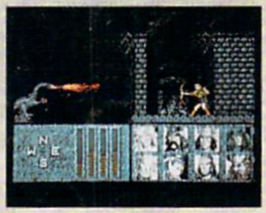
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